

**STANDARDISATION OF THE SEVEN GRAPHOLOGY FACTORS SCALE  
FOR APPLICATION IN INDUSTRY**

**by**

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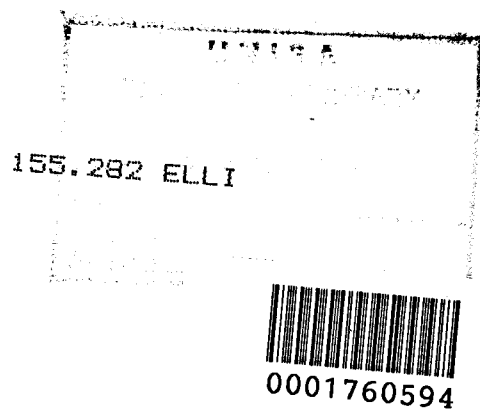
I declare that **STANDARDISATION OF THE SEVEN GRAPHOLOGY FACTORS SCALE FOR APPLICATION IN INDUSTRY** is my own work and that all the sources that I have used or quoted have been indicated or acknowledged by means of complete references.



**Charmaine Adelina Eliot Elliott**

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# **STANDARDISATION OF THE SEVEN GRAPHOLOGY FACTORS SCALE FOR APPLICATION IN INDUSTRY**

**PROMOTER : PROF F VAN N CILLIERS**

## **ABSTRACT**

The 7 Graphology Factors Scale is standardised for application in industry. A literature study based on the personality theories of Freud, Jung, Murray and Cattell precedes the empirical research. Graphology is conceptualised, relevant existing graphology models are explored and a graphology theory and method for use in industry proposes that graphology should be regulated and applications classified on the same basis as psychometric tests.

The empirical research is based on a sample comprising 360 subjects, stratified according to gender, position and language. The written protocol is subject to analysis of 59 characteristics on the basis of the configuration of the writing. Language is irrelevant and the presentation of an intervening stimulus is avoided. Factor analysis results in eight secondary factors. These are I Task Orientation - Directive, II Task Orientation - Conscientious, III Emotional Stability, IV Extroversion, V Independence, VI Conceptualisation, VII Openness to Experience and VIII Need for Power. Cronbach's alpha coefficient achieves 0,61 for Factor I. Stepwise regression analysis provides correlations between factors of the Thematic Apperception, Structured Objective Rorschach and 16 Personality Factor tests with all but Factor III, which is hypothesised to be a new construct. Five of the factors are hypothesised to align with the Big Five Personality Model. Three-way analysis of variance, t-tests and the Mantel-Haenszel tests are applied to establish differentiation based on the stratification criteria. Norm tables based on Indigenous, English and Afrikaans first language groups are provided in stems and bands.

Conclusions are that graphology has a worthy theoretical heritage and offers benefits to the psychological profession and specifically industry, as part of an assessment strategy. Limitations are outlined and recommendations are made for further research.

## **KEY TERMS**

Writing analysis, graphology, handwriting analysis, personality, personality assessment, psychometric, psychometric test, projective test, projection.

# **CHAPTER 1**

## **INTRODUCTION**

The aim of this chapter is to provide the scientific background to the study and to motivate the research. Background information will precede the problem statement. The aims of the research will be presented. The paradigm perspective of the research will be outlined. This will be followed by the research design and the research methodology. The penultimate section indicates the chapter division. The chapter will conclude with a summary.

### **1.1 BACKGROUND FOR AND MOTIVATION OF THE RESEARCH**

The broad discipline within which this research falls is psychology—that body of knowledge which deals with human behaviour and experience (Stagner & Karwoski, 1952). Psychology evolved as a separate empirical science in 1879, in the laboratory of Wilhelm Wundt in Leipzig, Germany (Jordaan & Jordaan, 1984). The focus being on the relationship between man, the laboratory and science. Psychology, as a profession, is concerned with the application of knowledge to practical problems (McCormick & Ilgen, 1989).

Industrial psychology, as a sub-discipline within psychology, is concerned with human behaviour in organisations (McCormick & Ilgen, 1989). The purpose is to achieve increased productivity, satisfaction and quality of work life (Greenberg & Baron, 1997). This necessitates, amongst other criteria, achieving a job-person match (Muchinsky, Kriek & Schreuder, 1998). This aim is realised by measuring job requirements (Beehr, 1996) and assessing individual attributes (Kleinmuntz, 1982).

Personality is a key determinant of behaviour at work (Adler & Weiss, 1988), and it correlates with measures of job performance (Barrick & Mount, 1991; Hunter & Hunter, 1984; Ones, Viswesvaren & Schmidt 1993; Gilliland, 1993). One assessment technique which investigates personality is graphology. Graphology is the science of writing

analysis (Hearns, 1966) and one of the oldest psychological approaches (Roman, 1952). Graphology is the subject of a perplexing paradox: the widespread use of graphology is accompanied by a barrage of damnation. It is increasingly being used in commerce (Briault, 1993), and is heralded as the oldest projective technique (Roman, 1952). In France it is applied by 93% of all organisations (Bruchon-Schweitzer & Ferrieux, 1991; Harris, Dworkin & Park, 1990; Shackleton & Newell, 1991), in Europe by 85% (Aamodt, 1996), in Israel by 80% (Edwards & Armitage, 1991), and in America by 3000 organisations (Steiner & Gilliland, 1996). Yet graphology is derided by the scientific community (Ben-Shakhar, Bar-Hillel, Bilu, Ben-Abba & Flug, 1986; Bruchon-Schweitzer, 1990; Bruchon-Schweitzer & Lievens, 1991; Daniel, 1993; Eysenck & Gudjonsson, 1986; Neter & Ben-Shakar, 1989; Furnham & Gunter, 1987; Furnham & Jaspers, 1983; Klimoski & Rafaeli, 1983; Lévy-Laboyer, 1990; Moscovici, 1992; Nevo, 1989; Peeples, 1990; Pickard, 1996a; Rafaeli & Drory, 1988; Rafaeli & Klimoski, 1983; Steiner & Gilliland, 1996; Tett & Palmer, 1997). This scepticism (Gooding, 1991) arises, in part, from negative associative labels like palmistry, phrenology, astrology, tea-leaf reading (Sonnemann, 1950; Sonnemann & Kernan, 1962), and bone throwing (Scanlon & Mauro, 1992). Hostility exists (Edwards & Armitage, 1991), there is outright condemnation of graphology (Furnham & Gunter, 1987), and Hartford (1989) labels it a public menace. The denunciation is, in some part, a function of its amateurish status (Rafaeli & Drory, 1988) evident in a lack of regulation in South Africa (Elliott, 1994). Graphology is not included in the psychology curricula of the South African universities, contrary to the trend in Europe since the 1960s (Graumann, 1983) and in Israel (Kurtz, Fleenor, Boone & Rider, 1989). Negative findings (Nevo & Benitta, 1993) prompt calls for more rigorous research (Satow & Rector, 1985). There is also no evidence of a standardised graphological instrument available for matching an individual in industry to a specific position. The 7 Graphology Factors Scale [7GFS] has been developed for the selection of management (Elliott, 1994) but has not been standardised.

According to Elliott (1994), graphology in South Africa is classified as a C Level psychometric personality test in terms of the Health Professions Act, 1974 as amended [Act 56 of 1974]. Psychometric tests mirror the paradox highlighted with reference to graphology. Their widespread use is juxtaposed with an avalanche of denunciation.

There are 1200 personality questionnaires available (Pickard, 1996a), 74% of all organisations use psychometric tests to assess personality (Pickard, 1996b), and they are viewed as a useful alternative to the interview (Thayer, 1988). However, personality questionnaires of the self-report variety are criticised because the individual fakes responses to specific questions (Coutts, 1990) in an attempt to portray himself positively (Miner, 1969) or to make a good impression (Davey, 1984). The fact that psychometric tests discriminate between one individual and another is held as a benefit (Cascio, 1987) until the variable of group membership is introduced. Then they are castigated for restricting the opportunities of the individual who has been historically (Hughes, 1989), educationally or culturally disadvantaged (Irvine, 1966). Should psychometric tests succeed in their objective to achieve the best job-person fit (Muchinsky et al, 1998), they are castigated for containing content in a form and style that prejudices the performance of the individual from a disadvantaged group (Irvine, 1966), for being standardised for a single race group (Hughes, 1989), for being framed in the second language of the individual (Wolmarans, 1997), or for resulting in scores that have different meanings for individuals from specific groups (Taylor, 1987). Where the use of psychometric tests results in imbalances in the numbers of individuals employed from different groups (Coutts, 1990), the condemnation is labelled disparate treatment, disparate impact (Seymour, 1988) or adverse impact (Cronshaw, 1986). Outrage at adverse impact, in the United States of America, manifested in litigation (Seymour, 1988), and reduced the usage of psychometric tests during the 1960s and 1970s (Aamodt, 1996). South Africa now appears to be following the precedent set in the United States of America. In the industrial setting, the South African Employment Equity Act [Act 60 of 1998] at section 5 (1) provides that:

No person may discriminate unfairly, directly or indirectly against an employee, in any employment policy or practice, or on one or more grounds, including race, gender, sex, pregnancy, marital status, family responsibility, ethnic or social origin, colour, sexual orientation, age, disability, religion, conscience, belief, political opinion, culture, language and birth.

Specifically, referring to testing, section 5(4) of Act 60 of 1998 provides that:

Testing of an employee for any medical condition is **prohibited** unless—

- a) legislation permits or requires the testing, or
- b) it is justifiable to do so in the light of medical facts, employment conditions, social policy, the fair distribution of employment benefits, or the inherent requirements of a job.

In section 5(5), “employee” includes an applicant for testing, and in section 61 “testing” is defined as any “test, question, inquiry or other means designed to ascertain or which has the effect of enabling the employer to ascertain whether an employee has any medical condition”. This definition, according to Eckstein (1998), includes psychometric tests.

The implication is that in South Africa there will be negative consequences associated with the use of poor quality psychometric tests (Mc Henry, 1997) that are biased on the basis of culture or gender (Fowler, 1997). Warnings that personality tests developed for American ethnic minorities do not demonstrate comparable performance for British ethnic minorities (Pickard, 1996b) must be heeded. The finding of Abrahams (1996), that the 16 Personality Factors test [16PF] is unsuitable for use in South Africa, emerged after the commencement of this research, but makes the point that tests suitable in other countries cannot be applied with confidence in South Africa.

The pessimistic sentiments associated with psychometric tests (Fowler, 1997; Hughes, 1989; Irvine, 1966; McHenry, 1997; Pickard, 1996a; 1996b; Taylor, 1987; Wolmarans, 1997) are aggravated by the proposed legislation of affirmative action. Affirmative action aims to rearrange the number and status of members of representative groups through preferential treatment of the historically disadvantaged (Ewong & Elliott, 1997). In South Africa there are inadequate data to confirm whether or not tests are biased or demonstrate differential validity (Huysamen, 1996). Holdstock (1981) cautions against blindly and uncritically accepting the premises of psychology of foreign origin. Personality assessment is criticised for imposing Westernised psychology on members

of a multi-cultural society and adjudged to be "catastrophic" in South Africa (England, 1991, p.52).

In the last two decades, the anti-psychometric trend in the United States of America has reversed, as research demonstrates that responsibly used (Hunter & Hunter, 1984) they can be effective predictors of future performance (Aamodt, 1996). The context in the United States of America is, however, different to that in South Africa. The prevailing sentiment in the United States of America is that affirmative action humiliates Blacks and discriminates against Whites (Huysamen, 1996). Programmes aimed at improving employment opportunities for women and ethnic minorities in California have been compulsorily terminated (Goodavage, 1995; Riccucci, 1997).

In South Africa, psychological assessment tools that are beyond criticism, especially on the grounds of discriminating against disadvantaged group members, must be made available for application by industrial psychologists. Selection standards and practices need to facilitate the removal of arbitrary, artificial and unnecessary employment barriers, so that the talent in historically disadvantaged groups can be tapped (Albertyn & White, 1994).

Graphology is proposed as a technique for assessing personality in industrial settings. It appears to have the potential of circumventing many of the objections associated with traditional tests. It is a projective technique (Roman, 1952). There is less possibility of faking responses, no presentation of a stimulus that could be charged with cultural bias, no criticism on the grounds of second or third language, because it is shapes, letter forms and spacing (amongst other attributes) that assume importance (Mendel, 1975). Further, because the content is irrelevant to the analysis, there can be no criticism on the grounds of administration or response. The 7GFS, specifically, appears to offer a solution to the selection of managers. It has been developed on the basis of job analysis (Elliott, 1994), which is fundamental to the application of tests (Aamodt, 1996) and is the essence of an appropriate selection system (Hattrup, Rock & Scalia, 1997). It is also home-grown for the South African situation, which, considering the British warnings regarding American tests (Pickard, 1996a; 1996b), is a distinct advantage.



## **1.2 PROBLEM STATEMENT**

Industrial psychologists need to contribute to an international standard for performance output (Charoux, 1997). The realisation of what Muchinsky et al (1998) refer to as a job-person match is essential to this goal. This match can be achieved by analysing the job and assessing individual fit. A key job in society is that of the manager (Mintzberg, 1998). Management is a goal-orientated endeavour, necessitating working with and through others to achieve organisational objectives (Kreitner & Kowicki, 1998). Personality determines behaviour at work (Adler & Weiss, 1988), and influences job performance (Barrick & Mount, 1991; Gilliland, 1993; Hunter & Hunter, 1984; Ones et al, 1993). Personality can be assessed through psychometric tests (Pickard, 1996a; 1996b), but these are open to criticism (refer section 1.1). The sheer complexity of personality assessment is apparent from the research of Allport and Odbert (1936), which identified 17 953 descriptors of personality. Whilst acknowledging this complication, the industrial psychologist also needs to operate within a broader societal and legislative context. In South Africa, this requires advantaging the disadvantaged. It is debatable whether personality can be adequately conceptualised, considering that inadequate attention has been afforded to creating an integrative structure for personality theory and research (Rorer & Widiger, 1983; Wiggins, 1982). Even assuming that this can be achieved, it remains questionable whether the profusion of personality attributes can be clustered to determine functioning in industry. Given that it is, it remains a matter of inquiry as to whether the assessment of individual personality characteristics can proceed without discord.

Graphology—which is itself the subject of criticism (refer section 1.1)—has been put forward as a possible means of overcoming some of the objections directed at psychometric tests. Should graphology offer hope in the assessment goal, the following questions need to be addressed: How shall graphology be conceptualised? What models exist? And how can these models be integrated to make possible the application of graphology in industry? The 7GFS has been specifically proposed as an instrument which has been developed to meet the key requirement of measuring attributes that are specific to the job of a manager in the financial services sector in South Africa. This scale has not been standardised. Accordingly, the issue arises as

to whether the 7GFS can be standardised for application in industry. In the event that the 7GFS does meet standardisation criteria, a further question arises as to whether recommendations can be formulated for the use of graphology in industry and in academic institutions.

In summary the research questions are:

- How can personality be conceptualised for the purposes of this research, which personality factors are relevant, and how do these determine effective functioning in industry?
- How can graphology be conceptualised, what relevant graphology models exist, and how can these be integrated into a theory and method for use in industry?
- Can the 7GFS be accepted as a standardised instrument for application in industry?
- What recommendations can be formulated for the practice, academic application and further research of graphology?

### **1.3 AIMS OF THE RESEARCH**

The general and specific aims follow:

The general aim of this research is to standardise the 7GFS for application in the financial services industry in South Africa.

The specific aims are:

- to conceptualise personality, to establish relevant personality factors, and to determine how these contribute to effective functioning in industry.
- to conceptualise graphology, to explore relevant existing graphology models,

and to determine how these can be integrated into a theory and method for use in industry.

- to standardise the 7GFS as an instrument for application in industry.
- to formulate recommendations for the practice, and academic and further research of graphology.

## **1.4 THE PARADIGM PERSPECTIVE**

The paradigm perspective includes the intellectual climate and the market of intellectual resources (Mouton & Marais, 1996):

### **1.4.1 THE INTELLECTUAL CLIMATE**

The intellectual climate refers to meta-theoretical values and beliefs upheld by practitioners at a specific point in time (Mouton & Marais, 1996). The focus in this research is industrial psychology, drawing on personality, personnel and cross-cultural psychology, and psychological measurement.

Industrial psychology is the scientific study of human behaviour for practical application (McCormick & Ilgen, 1989) in organisations (McCormick & Ilgen, 1984). Behaviour can be seen as anything done by the individual (Gouws, Louw, Meyer & Plug, 1979), and described as anything that a person does in the work setting (Ivancevich & Matteson, 1993). Organisational culture is a system of shared meaning ascribed to members of an organisation, differentiating it from other organisations (Schein, 1985). Organisational behaviour can be seen as the impact that individuals, groups, and processes have on behaviour aimed at improving organisational effectiveness (Greenberg & Baron, 1997; Robbins, 1998).

Personality psychology comprises theory, research and assessment (Hjelle & Ziegler, 1986). The assessment of personality is the “art of sizing up people” (Kleinmuntz, 1982,

p.1) and expressing the results in quantitative appraisals (Baughman, 1972) which identify and categorise consistent differences amongst people, regardless of biological and social influences (Maddi, 1976).

Personnel psychology measures the psychological characteristics of workers in relation to their jobs and others in the work environment (Gouws et al, 1979), and predicts individual differences in behaviour and job performance (Cascio, 1987) in order to achieve a job-person match (Muchinsky et al, 1998).

Cross-cultural psychology is the study of members of cultural groups whose different experiences lead to predictable differences in behaviour. Groups typically speak different languages (Brislin, Lonner & Thorndike, 1973).

Psychological measurement is the rule-bound assignment of numbers to indicate differences in the extent of attributes. Psychometrics is the application of psychological tests to establish the magnitude of attributes. A test is a standardised procedure which quantifies responses to a sample of tasks (Huysamen, 1987a). Discrimination—as the outcome of psychometric testing—predicts an individual's probability of success efficiently, reliably and validly (Drenth, 1979).

In this research, the literature review will be presented with personality as meta-theoretical concept. The conceptualisation of personality will be presented in chapter 2. Personality will first be discussed from the psychodynamic paradigm (Meyer, Moore & Viljoen, 1989). The assumptions of this view of human behaviour are based on the theories of Freud (1924) and Jung (1960). In essence these are that:

- the psyche comprises structures accommodated in differing levels of consciousness (Freud, 1965; Jung, 1991).
- personality originates predominantly in unconscious factors (Freud, 1924).
- the understanding of personality is dependent on accessing the depths of the unconscious and converting this content to consciousness (Freud, 1973).

- those techniques which are suitable for breaking through the barriers to the unconscious must rely on indirect approaches, whereby the individual is encouraged to offer projected input for analysis. Free association (Freud, 1965), dream analysis (Freud, 1953; Jung, 1959a), and the Thematic Apperception Test [TAT] (Murray, 1938) are the specific techniques applied to this end.
- the explanation of personality relies on the interpretation of the psychoanalyst (Freud, 1924; 1965; Jung, 1954a).
- inferences about behaviour are contingent upon unravelling the mysteries of the unconscious and testing these against theories advanced by Freud (1924) and Jung (1960) about the impact of intangible structures and traumatic events at the envisaged stages of development.

Personality will, secondly, be discussed from the dimensional paradigm (Meyer et al, 1989). The assumptions of this view of human behaviour are based on the work of Murray (1938) and Cattell (1950). In essence these are that:

- behaviour, as the product of personality, is the key to understanding personality (Cattell, 1965; Murray, 1938).
- needs (Murray, 1938) and traits (Cattell, 1957) inform personality.
- genetic and environmental factors contribute to the development of specific traits (Cattell, 1978).
- the application of statistical analysis, in increasing levels of complexity, is the key to understanding personality (Cattell, 1978).

The key difference between the approaches of psychodynamic proponents and dimensional approach proponents is whether the inside-out or outside-in perspective is employed. The psychodynamic proponents attempt to understand personality from the mysterious interior of the individual, whilst the dimensional approach proponents

attempt to understand it from observable behaviour, and underplay the underlying structures.

#### **1.4.2 THE MARKET OF INTELLECTUAL RESOURCES**

The market of intellectual beliefs is, according to Mouton and Marais (1996, p.21) "that collection of beliefs which has a direct bearing upon the epistemic status of scientific statements". Theoretical beliefs are testable statements about social phenomena. They are the "what (descriptive) and why (interpretative) aspects of human behaviour". Statements applicable to this research are evident from relevant typologies, models and theories:

- 1 A typology is a conceptual framework for classifying common characteristics (Mouton & Marais, 1996). The typology for graphology (Elliott, 1994) substantiates graphology as a psychological test (Act 56 of 1974). It is based on analysing handwriting to measure personality (Allport & Vernon, 1933; Wellingham-Jones, 1987; 1989) through projection (Greene & Lewis, 1980; Singer, 1969).
- 2 A model is a conceptual framework to classify new relationships for investigation (Mouton & Marais, 1996). By providing an overview, models precede theories in stimulating inquiry to understand a domain. Relevant models include an organisational dynamics model, a graphology model, and a personality model. Kotter's (1978) model arranges key structures around a hub of organisational processes. Key structures include formal organisational arrangements and employees. The individual, according to McGrath (1976), is an important contributor to organisational functioning. This model accords with open systems theory, discussed below. Elliott's (1994) model for graphology is a foundation model for this research. In terms of this model, defined measurement and scoring of handwriting characteristics leads to diagnostic or predictive uses. Prediction results in classification and selection. The "Big Five" Model proposes that five basic personality dimensions are the source of all others (Digman, 1990). For comparative purposes, it will apply to this research. The five factors

are Extroversion, Agreeableness, Conscientiousness, Emotional Stability and Openness to Experience (Howard & Howard, 1995; McCrae & Costa, 1990; Mount, Barrick & Strauss; Mount & Barrick, 1995; 1994; Pervin, 1996).

- 3 A theory is a set of interrelated propositions, definitions and concepts that specify relationships between variables in order to explain and predict phenomena (Mouton & Marais, 1996). Theories relevant to this research include open systems theory and personality theory, stemming from the clinical and correlational research traditions. Open systems theory has as a basic theme that the whole is greater than the sum of its individual parts (Van Dijck, 1973). The definable components, in an organisational context, have equal status. They are structured hierarchically into organisational, departmental, team and individual systems (Payne & Pugh, 1971). Objects comprising an open system are in mutual interaction with their environment (Van Dijck, 1973), whilst the concept of equifinality proposes that both organisation and employees have histories which influence future relationships (Riggs, 1978). Positive or informational feedback fosters growth (Van Dijck, 1973), whilst maintenance input satisfies needs (Riggs, 1978). The open system seeks homeostasis, and is self-regulating (Van Dijck, 1973) and adaptive (Visser, 1985). Despite resistance to change, as a response to negative feedback (Van Dijck, 1973), the system can shift and reorganise (Searight & Openlander, 1988). Personality theory stemming from the clinical research tradition concerns the systematic, in-depth study of individuals. It embraces the depth psychologists Freud (1973) and Jung (1940) who specifically offer theories which contribute towards the realisation of the specific aim of this research concerning the conceptualisation of personality.

Freud's (1924) psychoanalytic theory focuses on the conscious, preconscious and unconscious in interplay with the id, ego and superego as the chief structures of personality. Development is conceived of as being biologically driven through erogenous zones during specific stages, and completed within early childhood. The dynamics of personality involve the hedonistic reduction of tension, focussed on drives motivated by bodily states of excitation. Pleasure

or distress are the outcomes of actions to release tension (Freud, 1961). Theoretical structures include the conscious experience of "me" (Jung, 1960, p.347), the personal unconscious as the individual's experiences and perceptions of external events (Jung, 1960), and the collective unconscious as universal to all human beings. Within the collective unconscious are archetypes, which can be expressed through symbols. A symbol represents something that is covertly evident in phenomena like handwriting (Jung, 1974). The development of personality is the consequence of a process of individuation and transcendence. Individuation occurs where the undifferentiated psyche of the infant divides into subsystems, whilst transcendence refers to the development of a synthesis between the opposing differentiated systems. The dynamics of personality involve equality and entropy, which concern the distribution of energy between the subsystems of the psyche (Jung, 1940). The correlational research tradition inspired the dimensional proponents, Murray and Cattell, who offer theories contributing to psychometrics (Pervin, 1996). This tradition adds to the general aim of the research—to standardise the 7GFS for application in industry.

Murray's (1938) theory relies on personality as a hypothetical entity determinable only from behaviour. Development of personality is conceived of as proceeding through three main developmental stages. It is during childhood that complexes develop when pleasurable pursuits are constrained by societal rules (Murray & Kluckhohn, 1967). The dynamics of personality revolve around the concepts of need, press and thema. Need refers to individual motivation. Press refers to events in the environment. Thema is the interaction between needs and press. It is this interaction between needs and environment that determines human behaviour (Murray, 1938) and which introduces a useful concept for this research: behaviour, within a work setting.

Cattell's (1950) theory, at the structural level, highlights traits as relatively stable characteristics. The emphasis is on measurement and quantification, which at the most sophisticated level occurs through factor analysis (Cattell, 1978). Factor analysis is founded on the specification equation predicting the behaviour



of an individual in a specific situation through assigning weighted scores (Cattell, 1965). With regard to development, hereditary factors and environmental factors are conceived of as playing distinct roles, depending on the specific trait (Cattell, 1973). Dynamics refers to personality traits as constructs which have developed according to the rules of factor analysis, and which are based on empirical research. A limitation of the correlational approach is that it is typically restricted to self-report inventories (Pervin, 1996). In this research, it will be applied in a non-self-report context.

### **1.4.3 METHODOLOGICAL CONVICTIONS**

Methodological convictions concern the nature of scientific research and social science (Mouton & Marais, 1996). In this research, the role of the first person is researcher seeking new knowledge to apply to a specific problem in a work setting, test-administrator, graphologist, and interpreter of psychometric information. The role of the second person is that of test subject and psychometric respondent contributing to research.

Standardisation requirements include statistical procedures to determine reliability, validity and freedom from bias. Reliability refers to the stability, dependability and predictability of the results of an instrument, and assumes that further applications will yield the same results (Kerlinger, 1973). Cronbach's alpha is a calculation to establish the internal consistency of a scale. It establishes the correlation within a scale where it is assumed that the items on the scale are positively correlated because they measure a common entity (Norusis, 1992).

Validity means that an instrument should measure what it purports to measure (Roscoe, 1975). Different types of validity include construct, content (Cole, 1981), differential (Lawshe, 1983), job-specific (Schmidt, 1988), criterion-related (Cole, 1981) and concurrent (Barrett, Phillips & Alexander, 1981). Kerr's (1990) view—that the distinction between types of validity has value only for indicating the various inferences that can be drawn from test scores—is relevant to this research. Construct validity explains the variance or meaning of the test according to the factors or constructs that

lie behind test performance. The empirical testing of the constructs (Kerlinger, 1973) will be assessed by stepwise regression analysis involving the SORT, 16PF and TAT as independent variables, for establishing co-variance. Regression analysis tests the hypothesis that there is no relationship between the independent and dependent variables. A multiple regression analysis tests the hypothesis that there is no relationship between the combined independent variable and the dependent variable (Roscoe, 1975). Content validity relevant to this research will determine whether the internal test structure of items or sub-scores is similar for different groups (Cole, 1981) as a second application of Cronbach's coefficient alpha. Differential validity refers to the need to validate a test for every sub-group for which it is to be used (Lawshe, 1983), and to determine whether it is more valid for one group than another (Aamodt, 1996). Differential validity will be established by subjecting the scores attained by individuals, representing sub-groups, to three-way analysis of variance (three-way ANOVA) within groups and between groups to establish differences. ANOVA, where there are more than two groups, extends the assumptions of normality and homogeneity of variance to more than two groups (Huysamen, 1987b). A t-test (Norusis, 1992) will be conducted to test the null hypothesis that the difference between the means of two populations has a particular value, typically zero (Huysamen, 1987b). Job-specific validity determines whether a test is valid for the position for which it is required (Schmidt, 1988; Schmidt & Hunter, 1978). The three-way ANOVA will highlight differences in the scales. The t-tests will be applied to focus on specific differences (Norusis, 1992) for the 7GFS scales. Criterion-related validity predicts the level of criterion performance and the extent to which those with high test scores perform well on the criterion and vice versa (Cole, 1981; Schmidt & Hunter, 1978). The 7GFS has not been designed to measure the universe of the job. It is therefore beyond the scope of this research to determine criterion-related validity. Concurrent validity establishes the criterion and predictor within a short period of time (Barrett et al, 1981). This aspect is also beyond the scope of the present research.

Bias refers to the impact of the psychometric properties of the test on the result. Bias can be avoided by defining criteria, groups, and characteristics for norms, and by specifying the context, recording levels of difficulty in relation to the job, stipulating relevance to the inherent or operational requirements of the job through emphasising

minimum job requirements, and ensuring that candidates have no prior knowledge of the job, position or organisation (Muchinsky et al, 1998). Reliability and validity (Anastasi, 1968; 1982; Cole, 1973; Saville & Holdsworth, 1997) and ensuring that the testing environment is the same for all applicants (Gilliland, 1993; 1994) are further requirements. Messick (1975) differentiates between intrinsic and predictive or correlational bias. Intrinsic bias refers to the psychometric properties of the test and the difficulty level of items. Correlational or predictive bias refers to the usefulness, validity and fairness of the test in terms of the purpose for which it is designed. The Mantel-Haenszel test (Norusis, 1992) will be applied to determine bias. Norms allowing for interpreting individual scores against scores for a homogeneous group (representative of the population) will be calculated. Scores obtained by the norm group in the final test form establish the norms of a test. Typically, scores are converted from raw scores. In this research, norms will be presented in stens, which is a normalised standard score with a mean of 5.5 and a standard deviation of approximately 2 (Huysamen, 1987b).

Meaningful norms require division into relatively homogeneous groups, differentiated into ethnic sub-groups within race groups (Sundberg & Gonzales, 1981). It is observed by Jones and Thorne (1987, p.489) "that should such variation be recognised, we would be confronted with an array of new norms for many different population sub-groups and with a growing proliferation of psychotechnology that places us at an ever increasing distance from the subject of our enquiry". In the United States of America, establishing norms on the basis of race is prohibited in accordance with the 1991 Civil Rights Act (Brown, 1994; Gottfredson, 1994). This has resulted in establishing bands to equalise employment rates by race as compensation for lower scores achieved by ethnic minorities on cognitive ability tests (Schultz & Schultz, 1998). In anticipation that the South African affirmative action route will follow the United States of America precedents, norms will be presented in bands and the sample stratified according to the first language of males and females in supervisory / management and marketing / administrative jobs.

## **1.5 RESEARCH DESIGN**

The research design requires that the conditions for collection and analysis of data

combine relevance with economy (Selltitz, Jahoda, Deutsch & Cook, 1965) to maximise the internal and external validity of the findings. Internal validity incorporates reliability and theoretical, inferential and measurement validity. External validity is synonymous with the requirement to generalise results (Mouton & Marais, 1996). Reliability will be controlled by applying sampling disciplines, involving experts in the research process, and cross-checking data. Theoretical and inferential validity will be achieved through basing conceptualisations on the analysis and synthesis of established models, theories and literature. Measurement validity will be enhanced by applying accepted methodological convictions. External validity will be enhanced by stratifying the sample to emphasise different job functions (Kurtz et al, 1989). Management—which is the focus job of this research—is a universal function (Robbins, 1991); thus the requirement to generalise the results is addressed.

The combined independent variable is the personality factors measured by the TAT, Structured Objective Rorschach Test [SORT] and the 16 Personality Factors Test [16PF], whilst the graphology factors measured by the 7GFS represent the dependent variable, to establish what Huysamen (1996) refers to as co-variance.

The literature review represents the exploratory component of the research. It is the subject of chapters 2 and 3 and works towards a qualitative outcome. The descriptive component concerns empirical research and is outlined in chapter 4, while quantitative outcomes are outlined in chapter 5.

The unit of study is the individual. The individual will be addressed in the masculine, which includes the feminine, except where specific gender reference requires the use of she / her.

## **1.6 RESEARCH METHODOLOGY**

The research will be conducted in two phases. Phase 1 covers the literature review in the form of exploratory research; phase 2 covers the empirical research.

### **1.6.1 PHASE 1 — LITERATURE REVIEW**

The literature review will be presented in two steps. First, there will be a conceptualisation of personality, establishing relevant personality factors and indicating how these determine effective functioning in industry. Secondly, there will be a conceptualisation of graphology, exploring relevant graphology models and determining how these can be integrated into a theory and a method for use in industry.

### **1.6.2 PHASE 2 — EMPIRICAL RESEARCH**

The empirical research design involves the selection of a sample, measuring instruments, data gathering, data processing, hypothesis formulation, reporting and interpreting results, and formulating conclusions, limitations and recommendations.

- The population from which the sample will be drawn is employees from a financial institution. A combination of purposive and quota sampling (Kerlinger, 1973) will be applied to select the sample, whilst ensuring that none of the homogeneous groups has less than 30 cases—this being the minimum requirement for research (Huysamen, 1987b; Van den Berg, 1989). The group will be stratified on the basis of position, first language and gender. Position differentiation is necessary because the 7GFS has been developed for managerial positions. Language differentiation acknowledges the differences in the written language structure, different school models (Wijnholds, 1984), and sensitivities associated with racial classification owing to rural and urban complexities (Abrahams, 1996). Linguistic groupings are cross-cut by factors like differential education, wealth, occupational status, religious beliefs and variables that are believed to be more meaningful than traditional culture. Whilst dividing Black society, they also create cross-cutting ties between Black and White (Human, 1990). Gender stratification stems from the assertion that different handwriting characteristics reveal different characteristics for males and females (Mendel, 1975), reported differences in personality between genders, and gender bias (Fowler, 1997). The sample will total 360 cases.

- The measuring instruments include the 7GFS, TAT, SORT and 16PF. The SORT, TAT and 16PF are included as projective techniques which access unconscious material because the 7GFS, which relies on projective material, is to be standardised. The 16PF is a self-report inventory, accessing conscious material, which is also evidenced in writing. The decision to include the 16PF was made before the study undertaken by Abrahams (1996)—reporting that the 16PF is not suitable for application in South Africa because the factor analysis does not result in the same factors—was concluded. However, Cattell (1994) confirms that the 16PF factors remained constant over a period of 20 years in application to a sample nearly four times that in the South African research. It is suggested that the difference in sample size may have affected the results adversely in the Abrahams (1996) research.
- Data gathering will take place through the administration to the individuals comprising the sample of the TAT Card 1, as recommended by Kruger (1980), the SORT according to standard procedures (Louw, 1975), and the 16PF as prescribed by Cattell, Eber & Tatsuoka (1992).
- Data processing will include scoring the 7GFS, TAT, SORT and 16PF according to the procedures laid down by Elliott (1994), Kruger (1980), Louw (1975) and Cattell et al (1992), respectively. The scores will be captured onto a database formatted by means of the PC Tools package (Dyson, 1990) for that purpose. Statistics will be produced by means of the Statistical Package for the Social Sciences [SPSS] (Norusis, 1992). Specific statistics include descriptive statistics, a factor analysis, stepwise regression analysis, Cronbach's alpha, three-way ANOVA, t-tests, and a Mantel-Haenszel test of linear association and norms.
- Hypotheses will be formulated around the aims of the research.
- Results will be reported and interpreted in chapter 5. The descriptive statistics will be presented first. The factor analysis, stepwise regression analysis, Cronbach's alpha, three-way ANOVA, t-tests, Mantel-Haenszel test and norms

will follow. Thereafter the results will be interpreted in the same sequence.

- Conclusions relating to the aims of the research will be presented in chapter 6. This chapter will also include limitations and recommendations based on the research questions.

Table 1.6 provides a flow diagram of the research methodology.

Table 1.6 Flow diagram of the research methodology

PHASE 1— LITERATURE STUDY				
AIMS	STEP	METHOD	DETAIL	REF
To conceptualise personality	1	Conceptualise personality	Historical development	2.1.1
			Definition	2.1.2
			Development of personality	2.1.3
			Structure of personality	2.1.4
To establish relevant personality factors		Establish relevant personality factors		2.2
To establish how personality factors determine effective functioning in industry		Establish how personality factors determine effective functioning in industry		2.3
To conceptualise graphology	2	Conceptualise graphology	Historical development of graphology	3.1.1
			Definitions of graphology	3.1.2
To explore existing graphology models		Explore existing graphology models		3.2
To determine how these can be built into a theory and method for use in industry		Determine how these can be built into a theory and method for use in industry		3.3
PHASE 2 — EMPIRICAL RESEARCH				
AIMS	STEP	METHOD	DETAIL	REF
To standardise the 7GFS for application in industry	1	Establish the population and sample		4.1
	2	Measuring instruments	7GFS	4.2.1
			TAT	4.2.2
			SORT	4.2.3
			16PF	4.2.4
	3	Data gathering		4.3



PHASE 2 — EMPIRICAL RESEARCH				
AIMS	STEP	METHOD	DETAIL	REF
	4	Data processing		4.4
	5	Hypothesis formulation		4.5
	6	Reporting results	Sample	5.1.1
			Descriptive statistics	5.1.2
			Factor analysis	5.1.3
			Cronbach's alpha reliability coefficients	5.1.4
			Stepwise regression analysis	5.1.5
			Three-way analysis of variance	5.1.6
			t-tests	5.1.7
			Mantel-Haenszel test	5.1.8
			Norms	5.1.9
		Interpreting results	Factor analysis through to norms (as for reporting)	5.2.1–5.2.7
To formulate recommendations for the practice, academic use and further research of graphology	7		Formulating conclusions	6.1
			Formulating limitations	6.2
			Formulating recommendations	6.3

## **1.7 CHAPTER DIVISION**

The chapter division will be as follows:

- Chapter 2 — Personality
- Chapter 3 — Graphology
- Chapter 4 — Empirical study
- Chapter 5 — Results
- Chapter 6 — Conclusions, limitations and recommendations

## **1.8 CHAPTER SUMMARY**

In this chapter, background information was presented to motivate the research. The problem statement was outlined. The aims of the research were presented. The research model was detailed and the paradigm perspective of the research outlined. This was followed by the research design and the research methodology. The penultimate section indicated the chapter division. This chapter achieves the aim of providing the scientific background to the research. Chapter 2 will deal with personality.

## **CHAPTER 2**

### **PERSONALITY**

The aim of this chapter is to provide an integrated model pertaining to personality, as relevant to this research. First, personality will be conceptualised. Thereafter, the relevant personality factors will be laid out. Then it will be established how these determine effective functioning in industry. The chapter ends with a summary.

#### **2.1 CONCEPTUALISATION OF PERSONALITY**

In this section, the historical development of personality will precede definitions. Thereafter, the development of personality will be laid out. The section concludes with a delineation of the structure of personality.

##### **2.1.1 HISTORICAL DEVELOPMENT**

There are three research traditions within the field of personality. These are the clinical, correlational and experimental traditions (Pervin, 1996).

- 1 The clinical approach involves the systematic, in-depth study of individuals in order to comprehend the unconscious. The research tradition was pioneered by Jean Charcot (1825–1923) who studied and treated hysterical patients largely through hypnosis. This was the first indicator that there were processes in operation inaccessible to conscious thought. Pierre Janet (1859–1947), a student of Charcot, found that patients could recall experiences under hypnosis which were inaccessible whilst awake. A second pupil of Charcot, Morton Prince (1854–1929), published the first case studies about multiple personalities, strengthening the notion that there could be one or more streams of consciousness operating separately from that manifested at a particular point in time. A third pupil of Charcot was Sigmund Freud (1856–1939), a trained medical researcher and a physician (Pervin, 1996).

- 2 Correlational research uses statistics to compare sets of measures, in respect of which individuals differ. The founder of this approach was Sir Francis Galton (1822–1911). Galton's interest lay in establishing which attributes, especially intellectual, had been inherited. Galton is responsible for the nature versus nurture debate. The correlation coefficient, a term coined by Galton, is a significant statistical procedure to be employed in establishing reliability in this research. Spearman (1863–1945), continuing the research into the field of intelligence, developed factor analysis to group personality characteristics. Cattell (1905– ) and Allport (1937), using every personality descriptor in the English language, developed a classification of the basic units of personality. After factor analysis, 12 factors emerged. This was later enhanced and introduced as the 16PF (Pervin, 1996). A limitation of the correlational approach is that it is typically restricted to self-report inventories. The psychometric school is part of the correlational research stable and measures traits. A trait, according to the psychometric school, is a term applied to characterise personality (Pervin, 1996). A unique aspect of the present research is that the correlational research method will be applied in a non-self-report context. The 7GFS results from scoring a handwritten protocol—as opposed to providing descriptive options for selection in a questionnaire form.
- 3 Experimental research relies on manipulating the independent variable systematically to establish the effect on the dependent variable. The experimental approach involves many subjects, in contrast to the correlational approach where the focus is on the individual (Pervin, 1996). The principles of experimental research do not apply to this research.

### **2.1.2 DEFINITIONS OF PERSONALITY**

Kleinmuntz (1982) asserts that most psychologists concur with Allport (1961, p.28) "that personality is the dynamic organisation within the individual of those psychological systems that determine his characteristic behavior and thought." Underlying biological factors are emphasised (Arvey & Bouchard, 1994). Jung (1928) focuses on the contribution of conscious experiences, as well as the unconscious, indicating that the

individual is striving towards an ideal personality through modification of motivational forces in the face of experience. The developmental aspect of personality is highlighted by Freud (1924; 1953) who conceives of developmental stages in childhood. Erikson (1958) extends the Freudian developmental phases to eight phases throughout a lifetime. Failures and successes in resolving the conflicts that arise at each of these stages inform personality. Cattell (1950) adds the notion that personality can be predicted from behaviour.

Building on the concepts presented in these definitions, an appropriate definition for this research is that personality is a biological, unconscious and conscious interplay of dynamic structures, which, in interaction with environmental factors, drive purposeful behaviour.

### **2.1.3 DEVELOPMENT OF PERSONALITY**

Development of personality, as proposed by Freud (1924; 1953; 1961; 1965; 1973), Jung (1928; 1940; 1953; 1954b; 1959a; 1959b; 1960; 1974; 1991), Murray (1938) and Cattell (1950; 1957; 1965; 1973; 1978), follows. The section concludes with an integrated model of development.

- 1 Freud (1965) maintains that personality development is completed within early childhood. Children pass through stages of development characterised by changes in the body regions. These are known as erogenous zones, and provide instinctual gratification. Significant stages of development are the oral stage, the anal stage, the phallic stage, a latency period, and the genital stage. Normal personality development involves the uneventful transition from one erogenous zone to the next, dependent on receiving the right amount of libidinal stimulation. A fixation occurs if there is either over- or under-gratification in a particular stage. Regression occurs in adult life when immature behaviours are used to obtain psychic gratification in response to hostile events (Freud, 1924). The id, ego and superego are basic structures in Freud's (1965) theory (refer section 2.1.4). The id is present at birth and drives need fulfilment. The superego develops in response to societal constraints. The ego develops

throughout life. It balances id needs and superego restraints within an environmental reality (Freud, 1961). Action is aimed at finding an object that will release energy or reduce tension. These actions include automatic reflex actions and wish fulfilment (Freud, 1924).

- 2 Jung (1954b) maintains that the development of personality is the consequence of a process of individuation and transcendence. Individuation occurs where the undifferentiated psyche of the infant divides into subsystems termed the ego, persona, shadow, anima and animus. These structures compete to form a unique integrated system. Transcendence refers to the development of a synthesis between the opposing differentiated systems. The term channelling of the libido (Jung, 1960, p.41) describes the transformation of energy through progression and regression. Progression refers to adaptation to environmental conditions, and is indicative of extroversion. Regression, which is evidenced in introversion, occurs when competing subsystems cannot reach a compromise. Sublimation is the result of displaced energy (Jung, 1960).
- 3 Murray (1938) conceives of three main developmental stages. These are childhood and youth, adulthood, and old age. It is during childhood that complexes develop. At this time societal rules curtail pleasurable pursuits. The five areas which lead to the development of complexes are the warmth of the mother's womb, breast-feeding, expulsion of waste matter, urinating and sexual pleasure. In the prenatal period, three claustral complexes develop. Oral complexes arise from the breast-feeding and weaning experiences. Anal complexes originate from retention and expulsion. Youth is characterised by growth. Adulthood is characterised by conservation of action skills, whilst old age is characterised by physical and psychological decline (Murray & Kluckhohn, 1967).
- 4 Cattell (1965) asserts that hereditary factors and environmental factors play differing roles, dependent on the trait. Referring to the 16PF, Enthusiasm (Factor F), Rebelliousness (Factor J), Sensitivity (Factor I), Outgoing (Factor A), Emotional Stability (Factor C) and Intelligence (Factor B) are first-order factors

found to be most strongly influenced by hereditary factors. Environment influences Independence (Factor Q2+), Tension (Factor Q4+) and Experimenting (Factor Q1). The second-order factor, Extroversion (Factor A), is most strongly influenced by hereditary factors. Experimenting (Factor Q1+) is the least influenced by hereditary forces. The interaction between hereditary factors and environment results in pressure on the individual to conform to social rules (Cattell, 1973).

- 5 A model of development is based on integrating the concepts of Freud (1924; 1953; 1961; 1965; 1973), Jung (1928; 1940; 1953; 1954b; 1959a; 1959b; 1960; 1974; 1991), Murray (1938), and Cattell (1950; 1957; 1965; 1973; 1978). It is evident that there is a portion of personality which is essentially predetermined. The archetypes accommodated in the collective unconscious, according to Jung (1971; 1974), inform personality. Pre-natal events as the cause of complexes later in life are a further example of the hereditary influence on personality. The trauma of birth can also cause complexes (Murray, 1938). Cattell (1965) maintains that there are a number of personality traits which are hereditary. From birth, biology creates the impetus for personality development. Stages of physical development give rise to biological needs. The id, as an unconscious structure, interacts with physical needs to drive pleasure fulfilment (Freud, 1961). Murray (1938) conceives of three main developmental stages. These are youth, adulthood, and old age. Freud (1965) differentiates the childhood phase into oral anal, phallic, latency and genital stages. He concludes that personality development is completed during childhood. Cattell (1973) subscribes to the notion of environmental influences on specific traits. The superego, according to Freud (1924), has the role of imposing constraints on unmoderated id urges through assimilating societal values. The ego manages id needs and superego guilt through finding objects in the environment which will satisfy both structures. Developmental experiences determine personality, based on personal impact. One result of development can be a normal (Freud, 1924), integrated (Jung, 1974) personality. Another result can be fixations which lead to regression (Freud, 1965) or complexes (Murray, 1938). Personality is manifested in behaviour, and Cattell (1978) refers specifically to observable traits which are

acquired through environmental influences. Jung's (1940) contribution is that development is dynamic, with perpetual tension between the individuation of subsystems and the goal of transcendence. The subsystems tend towards individuation, defying the ultimate goal of transcendence.

#### **2.1.4 STRUCTURE OF PERSONALITY**

The structure of personality, as conceived of by Freud (1924; 1953; 1961; 1965; 1973), Jung (1928; 1940; 1953; 1954b; 1959a; 1959b; 1960; 1974; 1991), Murray (1938), and Cattell (1950; 1957; 1965; 1973; 1978), precedes an integrated model of the structure of personality:

- 1 Freud (1953) conceives of the primary structures of personality as the id, ego and superego. Survival is the common goal of these structures. Collective structures which foster self-preservation are termed eros. All functioning is directed at minimising the fears of life and death (Freud, 1924). Despite a common goal, all the structures, function interdependently.

The id functions primarily at an unconscious level as the innate component of the psyche. It receives energy from the body and is linked to drives. It seeks immediate pleasure gratification. It is selfish, unrealistic and achieves satisfaction through imagined objects and fantasies (Freud, 1953).

The superego is the source of guilt. It receives energy in the form of fantasies. These have the same effect as carrying out the actions associated with the fantasies. The superego is receptive to the moral codes imposed by society and is susceptible to pressure to conform (Freud, 1961).

The ego is interposed between the id's need for instant pleasure and the constraints imposed by the guilt-ridden superego. The ego interacts with the environment to satisfy the id without punishment from the superego. It is realistic in its orientation. It applies sensory perception and judgement to evaluate different courses of action. It tests choices against reality. It chooses objects that



will be gratifying, and distributes energy appropriately to meet needs in an acceptable manner. The ego is a structure which experiences continual conflict. The death or aggressive instinct, termed thanatos, is the only instinct attributed to the ego. It refers to the desire of the individual to return to an inorganic state, and offers an explanation for injury, hatred and sadism. The pleasure-loving id applies pressure to convert unrealistic fantasies into fulfilling actions immediately. The superego imposes pain and punishment if societal demands are transgressed (Freud, 1973). The ego develops throughout life, continually seeking objects in the environment that will satisfy the demanding id without antagonising the moralistic superego (Freud, 1961).

The psyche is further structured into forms of consciousness. These are the conscious, preconscious and unconscious.

The conscious is that layer of personality experienced in everyday life. It is the receptor of the external world from the senses. It is the small fraction of personality which is rational and logical (Freud, 1953). The ego operates within this domain, with connections to the other layers of consciousness (Freud, 1961).

The preconscious relates to phenomena that can be brought into awareness through paying attention to this purpose.

The unconscious relates to phenomena that the individual is not aware of and cannot be aware of, except under special circumstances (Freud, 1924). The unconscious is the home of the id. It provides a reservoir of memory traces and past events that cannot be recalled. At some point in time the person was aware of these ideas and images which have been forgotten because they are unimportant or distressing. They shape and mould personality into a unique construction. They are neither passive nor inactive. The operations of unconscious processes are qualitatively different from conscious processes. They are often illogical and irrational, and comprise symbols, metaphors and dreams. Anything is possible. Opposites can be reconciled. Events can coexist,

even though they happened at different times. Distant places can be brought together and large things may fit into small places. The dynamic unconscious contains drives, motives, fantasies, thoughts and wishes, largely sexual and aggressive in content. The contents of the dynamic unconscious seek expression and are kept from awareness only by the operation of protective barriers or defence mechanisms. These protective devices are also unconscious. The unconscious is plagued by conflicts. The dynamic nature of the unconscious is evident in the interplay between conflicts within the unconscious and between unconscious processes and conscious barriers (Freud, 1953). Its purpose is to protect the individual from painful thoughts, feelings and memories. The implication is that the person is "lived" (Freud, 1924, p.397) by unknown, unconscious and at times uncontrollable forces. The individual is uninformed, unaware and pushed to think and act in ways that he cannot explain. He is tied to his biological instincts and unable to exercise free-will and rational judgment (Freud, 1965). The significance of the Freudian approach is that the emphasis on the unconscious reduces the value of what people think, feel or do (Pervin, 1996). The paradox of living is the "tendency to maximise instinctual gratification whilst minimizing punishment and guilt" (Maddi, 1989, p.42). There is no tangible structure that can be pinpointed as constituting the unconscious. It is merely a set of contents and processes that are not available to conscious awareness. Yet the unconscious has the potential to influence psychological functioning (Freud, 1924). Psychoanalysts view elements of the dynamic unconscious as inaccessible to the conscious, owing to defence mechanisms (Pervin, 1996). The technique of "psychoanalysis aims at and achieves nothing more than the discovery of the unconscious in mental life" (Freud, 1924, p.397). Reports of dreams (Freud, 1953) and free association are techniques employed to gain access to the unconscious through revealing material in its original state (Freud, 1924).

- 2 Jung (1940) acknowledges the conscious, the personal unconscious and the collective unconscious as structures. The psyche is a dynamically structured entity which strives towards "wholeness" (Jung, 1960, p.307). The independent components are polarised in their relationship (Jung, 1954b).

The conscious, referred to as ego-consciousness and the conscious experience of "I" (Jung, 1960, p.347), is the essence of consciousness. It emanates from the unconscious. The ego includes the conscious experience of sensations, perceptions, feelings, thoughts, evaluations and the active components of memory. It facilitates the structuring of reality through sensory perception, whilst enabling the individual to understand external reality and to be a part of the social milieu (Jung, 1928).

The personal unconscious, available to consciousness, comprises the individual's experiences and perceptions of external events. There is constant interaction with the ego. There are mental images which lose their intensity through repression or through not being strong enough to penetrate the conscious (Jung, 1928). The key components of the personal unconscious are complexes, as transformed instincts. "An instinct which has undergone too much psychization can take its revenge in the form of an autonomous complex" (Jung, 1960, p.123). A complex is made up of a conglomerate of experiences or ideas which have assumed an intense level of emotionality, arising from repeated personal experiences, traumas, or moral conflicts or from archetypes. An archetype is the consequence of images and behaviours repeated over generations as an innate psychic predisposition which conditions perception and image formation (Jung, 1974).

The collective unconscious exists independently of the personal unconscious and the conscious. It is universal to all human beings. It influences the conscious, and comprises instincts and archetypes which can be expressed through symbols evident in dreams, fantasies, visions and myths, amongst other phenomena. An archetype exists for each universal human experience. Specific archetypes include the persona, the anima and animus, the shadow and the self (Jung, 1991). Structures in the psyche which serve to differentiate the irrational from the rational include thinking, feeling, sensing and intuition. Thinking is a logical process aimed at achieving objective explanations. Feeling is an evaluative function involving rational judgement. Sensation relates to the experience of external impulses through the senses. Intuition functions at a

subliminal level as unconscious perception (Jung, 1971). Equality and entrophy are concepts referring to energy distribution. Equality refers to the constant conservation of energy. Entrophy describes the flow of energy from stronger to weaker elements. In the quest to attain balance, energy is distributed between the persona and shadow archetypes. Opposition refers to the polarisation of subsystems to generate energy (Jung, 1974).

- 3 Murray (1938) construes personality as a hypothetical entity which drives and is determinable only from behaviour. Needs are tension-inducing cognitive structures. They organise perception, apperception, intelligence, condition and actions. Their purpose is to transform disagreeable situations. The periodicity of needs includes refractory, ready and active periods. In the refractory period tension is low. Environmental stimuli can evoke the ready phase. Behaviour stems from the active period, when the need is at its peak. Biological needs are most susceptible to the periodicity of needs. Psychogenic needs, in contrast, can be partially satisfied by wishes. Behavioural tendencies, described as vectors, are the consequence of aspiring towards specific goals or values. Values relate to physical well-being, power, knowledge, property acquisition, affiliation, ideology and aesthetic form. Vectors incorporate acquisition, rejection, elimination, avoidance, defendance, destruction, transmission, construction and reception. A proceeding is the combined effect of a value and a vector. Internal behaviour includes thinking, feeling, planning, evaluating and remembering. It can be inferred from verbal expression. External behaviour is directly observable. A further distinction lies in modal, directed or process behaviour. Modal activity is motivated by the sheer enjoyment of the activity. Directed behaviour is motivated by goal attainment. Process behaviour is that which is neither modal nor directed. Behaviour can also be classified as belonging to thematic units. Thematic units include time, spreading activities according to a schedule, and proceedings. Grouped proceedings related to a broad goal are termed a serial programme. The striving towards sub-goals is termed a serial. Establishment describes the continual growth and development of the hypothetical personality. An establishment includes values, goals, knowledge and needs. Needs intra-relate and compete. An establishment informs

proceedings and predicts behaviour. Prepotency occurs where the more demanding needs require partial gratification before other, subsidiary, needs can be expressed. Subsidiation is the term for lesser needs. Fusion occurs when a single behavioural outcome satisfies more than one need. Factors in the environment serve to facilitate or obstruct need satisfaction. These factors include other people, objects, and events, and are termed press. Alpha press refers to objective factors in the environment. Beta press relates to subjective perceptions. The interaction between needs and press is termed thema.

- 4 Cattell (1978) deduces personality from the measurement and prediction of all possible factors that influence it. The structural elements of personality are traits. A trait is a relatively stable behavioural characteristic. They are distinguished as source or surface traits. Source traits underlie and determine surface traits. They pertain to motivation, temperament and ability. Motivational traits direct behaviour, and are based on sentiments, attitudes and interests. Temperament or style traits refer to responses based on feelings, and are typically viewed as general personality traits. Ability traits refer to the effectiveness with which an individual attains a goal in complex situations. Factor analysis is the method to determine source traits. The factor analysis must include all characteristics, and correlate through oblique rotation. Surface traits are changeable, observable and can be described in everyday language. They have no biological or genetic foundation (Cattell, 1973). The specification equation allows for predicting the behaviour of an individual in a specific situation by combining source traits to understand and predict any achievement, response or behaviour. Weights are established to determine the relative importance of a cluster of traits to the achievement of a specific task or goal, in a specific situation, through factor analysis (Cattell, 1965). The quantification system employed by Cattell is expressed in the terms alfa, beta, gamma, delta and epsilon. Alfa describes an exaggerated feeling of omnipotence. Beta expresses the ego drive in the conscious and purposeful development of the motivation. Gamma expresses an obligation to be interested in something, and is therefore viewed as stemming from the superego. Delta is a physiological autonomic response; and epsilon is an unconscious conflict factor (Cattell, 1957). Motives or attitudes are classified

as ergs and sentiments. Ergs, as a source of energy or potential for action, comprise factors which are indicative of internal biological drives. It is "a pattern found among dynamic manifestations by factor analysis, and hypothesised to be an innately determined, goal-directed activity" (Howarth & Cattell, 1973, p.809). Fear or quarrelsomeness is a theme evident in the ten erg factors. They relate specifically to assertiveness, anger or rage, security, sex, gregariousness, parental protection and compassion, inquisitiveness, hunger, religious dependence, self-resignation, narcissistic love of comfort, and religious dependence. Sentiments indicate behaviours required by the environment, and have an external object of interest, the "dynamic structures visible as common reaction patterns to persons, objects or social institutions and upon which all people seem to have some degree of endowment" (Cattell & Child, 1975, p.7). The five sentiment factors relate to the self, the superego, career, significant partner, and parents. The self includes physical and psychological aspects. The superego refers to striving towards the ethical-moral ideal. Significant partner includes marriage (Howarth & Cattell, 1973). The self sentiment is the most important in serving an integration role for sentiments and controlling the expression of ergs, evident in all behaviour (Cattell, 1957). The concept of a dynamic lattice captures the relationship between ergs, sentiments and attitudes. A goal is supported by sub-goals or sentiments. Attitudes are based on ergs or ultimate goals, and are therefore believed to be observable manifestations of underlying sentiments or direct expressions of ergs. One action can satisfy many ergs, directly or through sentiments. Ergs, as the source of basic energy, also supply energy for sentiments (Cattell, 1972).

- 5 An integrated model of personality structures is based on the theories of Freud, Jung, Murray and Cattell. The psyche is structured into layers of consciousness. These are the unconscious, preconscious and conscious (Freud, 1924). The unconscious is the seat of the id. It is energised by physical needs and seeks pleasure gratification. Imagination, fantasy and aggression are trademarks of the unconscious (Freud, 1953). The unconscious can be further subdivided into the collective and personal conscious. The collective unconscious is the domicile of the archetypes (Jung, 1960). Modal activity, motivated by enjoyment (Murray,

1938), is similar to the id as conceived by Freud (1961). The personal unconscious contains unique and exclusive experiences (Jung, 1928). The unconscious is the overwhelming instigator of behaviour. It is the residence of painful memories and experiences (Freud, 1953). It contains trivia and events that are deliberately repressed (Jung, 1959b). Unconscious and protective barriers or defence mechanisms block the escape of unconscious material (Freud, 1953). Psychoanalysis includes dream reports and free association. It aims to release unconscious material by bringing it to consciousness (Freud, 1924). Cattell's (1972) source traits appear to operate at an unconscious level. The preconscious is a structure which, with concentration, facilitates the emergence of unconscious material into consciousness (Freud, 1953). Consciousness is the seat of the ego. It is the structure which promotes effective interaction with the environment. The ego endeavours to satisfy id needs whilst overcoming superego constraints. A portion of the superego operates at a conscious level to assimilate moral and societal prohibitions (Freud, 1961). People in the environment demand performance at a conscious level. This is press. Prepotency, subsidiation and fusion, as conceived of by Murray (1938), offer insights into some of the conflicts of Freud's (1961) ego concept, to bridge the individual and the environment. The outcome of the Freudian ego's efforts could be labelled Murray's (1938) thema. The superego, whilst having operations in the other levels of consciousness, works to constrain the rash behaviour that might otherwise be prompted by the id (Freud, 1961). Rationality and logic are trademarks of consciousness. Murray's (1938) conception of internal behaviour, proceedings, establishments and serial programmes accords with the qualities of consciousness. Surface traits, as conceived of by Cattell (1994), appear to originate in consciousness. The structures of the psyche are continually clashing. The id demands pleasure. The superego demands obedience (Freud, 1961). The subsystems and archetypes seek differentiation, whilst an overriding goal of wholeness prevails (Jung, 1960). Needs must compete for the energy source and seek fulfilment (Murray, 1938). Personality traits developed through the operation of the structures are manifested in behaviour (Cattell, 1950). Behaviour is the consequence of the dynamic interplay of diverse forces within the psyche and environmental demands (Murray, 1938).

Behaviour is also classified according to motivation for the activity. This can be directed, modal or process. Thematic units, serials, serial programmes and establishments batch behaviours according to their source or objective (Murray, 1938). Cattell's (1957; 1965) contribution to the structure of the psyche lies in the statistical clustering of similar personality characteristics through the application of factor analysis. Weighting and the specification equation can be viewed as enhancements of the factor analytic method (Cattell, 1978).

## **2.2 RELEVANT PERSONALITY FACTORS**

The relevant personality factors are clustered by origin as follows:

- 1      Consciousness embraces all thoughts in awareness at a point in time (Freud, 1924) and actions that stem from deliberately conceptualised processes (Cattell, 1973). It is driven by the ego which applies realistic and logical thinking to convert id needs into practical probabilities. The id uses common sense to organise, plan and negotiate actions (Freud, 1924), adapting to environmental factors (Jung, 1971). Judgement (Jung, 1960) and evaluation (Murray, 1938) to achieve objective explanations (Jung, 1960) are functions of consciousness. Progressive or regressive tendencies will be manifested in extroversion or introversion (Jung, 1971), proactivity or reactivity. Affiliation is classified as a value (Murray, 1938). Feeling serves an evaluative function, involving rational judgement (Jung, 1971), compassion and security seeking a consequence of erg factors involving fear or quarrelsome emotions. Ethics, moral ideals and career orientation are a function of the superego (Howarth & Cattell, 1973). Compromise is the consequence of the ego resolving conflicts between the id drives and superego restrictions. Satisfaction is the consequence of need gratification (Freud, 1924). Avoidance is a vector (Murray, 1938). Dependence on religion, assertiveness, anger or rage stem from fear or quarrelsome emotions (Howarth & Cattell, 1973). Aggression arises from underlying ego instincts involving preservation. Injury, hatred and sadism emanate from thanatos (Freud, 1924). Power is a value (Murray, 1938). Attitudes are a consequence of ergs or ultimate goals, and are believed to be observable



manifestations of underlying sentiments or direct expressions of ergs (Cattell, 1965).

- 2 Unconsciousness is the seat of repression (Jung, 1971) and latent, socially unacceptable needs (Murray, 1938). The drive for pleasure is the consequence of id urges (Freud, 1924). Intuition functions at a subliminal level as unconscious perception (Jung, 1971).
- 3 Motivation, drives or instincts are driven by bodily states of excitation linked to erogenous zones (Freud, 1924). Motivation stems from tension to satisfy needs. Perception, apperception, intelligence and actions are organised by needs to transform disagreeable situations. Goal orientation is a function of aspirations (Murray, 1938). Conflict arises when id demands are thwarted by the conscience and morality of the superego. This is experienced as anxiety and distress (Freud, 1924).

In essence the motivation for behaviour stems from both conscious and unconscious needs and drives. Energy is released towards the satisfaction of the needs, through processes of conceptualisation to attain fulfilment by means of objects in the environment. Success determines relatively stable, albeit unique, personality traits.

## **2.3 HOW PERSONALITY FACTORS DETERMINE EFFECTIVE FUNCTIONING IN INDUSTRY**

The individual, as a function of need fulfilment, may be required to work (Cooper, Makin & Cox, 1993). An employee brings his own cultural lifestyle values and preferences to work. Differing levels of significance are placed on such aspects as earning a living, following a vocation, expressing individual values, self-actualising, balancing occupational and leisure activities, and developing and implementing skills (Muchinsky et al, 1998). In joining any organisation, the individual will be aware of the need to adapt to a unique organisational culture. Organisational culture filters down the hierarchy from the founders or leaders of the organisation. "There is a pattern of basic assumptions, invented, discovered or developed by a given group as it learns to cope

with the problems of external adaptation and internal integration — that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think and feel in relation to these problems” (Schein, 1985, p.9). The individual needs to assimilate new values in order to deal with information in new ways and learn to work in a complex environment (Ivancevich & Matteson, 1993) with unique symbols, rituals, myths, language and ideologies (Hoover, Campbell & Spain, 1990). Organisational culture influences behaviour at work. At an overt level, it represents the normative behaviours accepted by individuals, and also operates at a subtle and covert level (Kreitner & Kowicki, 1998).

Organisations, at a formal level, comprise levels of management, subdivision of work, channels of communication, delegation of decision-making, power, and control. The informal organisation includes roles, status, prestige in the hierarchy, informal leaders, cliques, norms, sentiments, socialisation criteria, sanctions, and a grapevine (Klatt, Murdick & Schuster, 1985).

The biologically driven (Freud, 1924) individual with hereditary or genetic predispositions develops and deteriorates physically. This phenomenon means that the individual is dynamic and develops through career phases (Schein, 1980). Diversity (Thomas, 1996) adds to the complexity, whilst organisations, too, evolve through stages of maturity (Ivancevich & Matteson, 1993). As with physical life, the individual is part of an evolutionary working experience, resulting in differing perceptions of similar experiences which evoke diverse behaviours. A persona (Jung, 1960) will be adapted for the working world. Adaptation between individual and organisation occurs through the establishment of a psychological contract as an unwritten set of expectations operating between each individual within the organisation, revolving around remuneration, working conditions, security, opportunities for growth and development, and feedback, amongst other issues. The implicit expectation within an organisation includes building the image of the company, loyalty, maintaining confidentiality, and doing more than is expected. This psychological contract is subject to ongoing renegotiation by both parties as the organisation and individual develop (Furnham & Jaspers, 1983; Schein, 1980). It is the complex interaction that determines the fit between the individual and the organisation. A clash in individual and organisational

culture means that the psychological contract will be broken and that the employee could leave the organisation (Schein, 1980). The degree of fit between the public and working persona and the personal self and the working persona will determine whether the individual remains in that environment or moves on (Jung, 1960).

Organisations are typically structured into functional units. It is the manager's responsibility to implement the psychological contract and to achieve a fit between the task of the unit, the personalities of the members and the organisational design. This includes measurement systems, rewards and job design structures (Roosevelt Thomas, 1990). A leader "exerts a significant amount of influence over and above that required to obtain routine compliance with the routine directives of an organization" (Katz & Kahn, 1966, p.301), and needs to recognise and manage differences (McCleod & Lobel, 1992). The individual gives up his ego ideal and substitutes it for the group ideal, as embodied in the leader. This cannot be tolerated for long unless it is integrated (Freud, 1961).

Figure 2.3 applies open systems theory (refer section 1.4.2) to indicate how personality factors determine effective functioning in industry.

According to Figure 2.3, inputs to the psyche include those factors which Freud (1924) labels as genetic or biological and those which Murray (1938) describes as environmental. These factors would be stored within the psyche in the structures which Freud (1973) would refer to as conscious, preconscious or unconscious. Further differentiation in these structures is evident in Freud's (1961) conception of the id located within the unconscious, while the superego and ego interact with each other and straddle the three levels of consciousness. Jung (1960) conceives of the unconscious as comprising the personal and collective unconscious. Each of the structures of the psyche has a function, and can be viewed as active and interactive in terms of open systems theory (Van Dijck, 1973). There is a competitive element, for example between id needs and superego sanctions, as outlined by Freud (1961), and it is therefore possible to conceive of processes within the psyche dynamically shifting, reorganising and seeking homeostasis (Searight & Openlander, 1988; Van Dijck, 1973; Visser, 1985). It is the composite of the processes of the psyche that inform personality.

The output is behaviour manifested in a personal or work setting. The behaviour displayed by the individual results in feedback from persons and objects in the environment (Van Dijk, 1973) which are received, by means of the senses, as fresh inputs to the psyche, as a component of the open system in interaction with the environment. The recurring cycle of inputs, processes, outputs and feedback results in development and change in personality and behaviour.

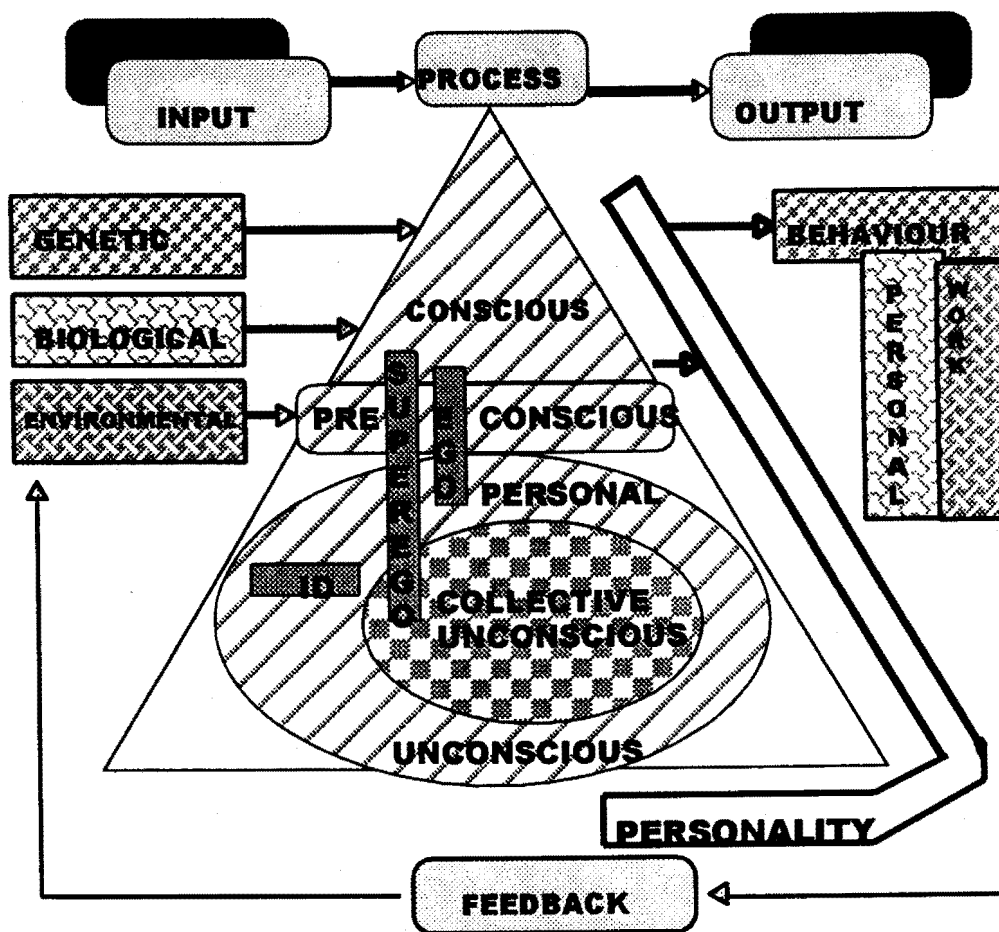


Figure 2.3 **Personality factors in an open systems framework** (Freud, 1924; 1961; 1973; Jung, 1960; Murray, 1938; Van Dijk, 1973; Searight & Openlander, 1988; Visser, 1985).

## **2.4 CHAPTER SUMMARY**

In this chapter, personality was conceptualised. An outline of historical development preceded a discussion about the development of personality and structures. Relevant personality factors were presented. The chapter concluded with a discussion about personality factors determining effective functioning in industry. The specific aim of conceptualising personality, establishing relevant personality factors, and determining how these contribute to effective functioning in industry has been achieved. Chapter 3 deals with graphology.

## **CHAPTER 3**

### **GRAPHOLOGY**

The aim of this chapter is to provide a conceptualisation of graphology. The historical development and definitions will precede an exploration of relevant existing graphology models. A graphology theory and method for use in industry will precede the chapter summary.

#### **3.1 CONCEPTUALISATION OF GRAPHOLOGY**

An account of the historical development of graphology precedes a definition of graphology.

##### **3.1.1 HISTORICAL DEVELOPMENT OF GRAPHOLOGY**

The practice of handwriting is more than 5000 years old (Hearn, 1966). In Europe, graphology preceded psychoanalysis, gestalt theory or projective techniques as a means of exploring personality. It is claimed by Taylor and Sackheim (1988) that Aristotle viewed handwriting as an indirect expression of mental experience. Hearn (1966) states that Seutonius, a Roman biographer of 80 AD, became aware of idiosyncrasies in the handwriting of Emperor Augustus, whilst Baldi (1644), a resident of Italy, initiated the analysis of handwriting in the 17th century. Klimoski and Rafaeli (1983) maintain that Goethe was the first to propose that character is projected in writing. Research into graphology for the purpose of classifying criminals began in 1860. Lombroso in Italy, Kraft-Ebbing in Germany, and Havelock Ellis in England were, according to Olyanova (1970), involved in this research, which found a partner in fingerprinting for personal identification. The interest in graphology as a means of identifying disease followed. Sir William Wilks and Dr Henry Maudsley initiated this research, which was continued by Dr William Hammond who was particularly interested in handwriting signs occasioned by brain and spinal cord disease.

The first graphological publications originated in France in the 1870s, written by Michon (1875) and Crepieux-Jamin (1888). Michon (1875) characterised graphology as an art, basing interpretations on observation and experience. The writings of hundreds of people known to him were analysed to find graphological signs which writers with similar traits have in common (Singer, 1969). Binet (1904) continued research into writing in France, followed by Piéron (1906) and Rougemont (1932). Publications followed from Switzerland, Italy, Holland and Germany (Graumann, 1983).

In Germany, between 1872 and 1885, Olyanova (1970) reports that Adolf Henz and Hans Basse established many of the rules that graphologists would follow in the future, in their quest to establish a system that could be applied for selection purposes in industry. Taylor and Sackheim (1988) credit Preyer (1895), a professor of physiology and psychology in Jena, Germany, with the first links between psychology and graphology. It was asserted that it is brainwriting, and the role of mental processes was established for the first time. According to Singer (1969), the psychology, physiology and pathology of graphology were combined in this theory.

In Great Britain, Saudek (1932) led British psychologists into contributing to graphology, and was spurred on by the influx of refugees from Germany. Psychiatrists and clinical psychologists used graphology for physical and pathological diagnosis and as an adjunct to the Rorschach and TAT (Olyanova, 1970).

In the United States of America, psychologists who investigated handwriting included Thorndike (1906), Downey (1910), Allport and Vernon (1933), and Cantril, Rand and Allport (1933). These investigations focused on specific graphological signs, without experimental investigation. Scientific approaches were hampered by a condemnation of graphology as belonging to what was termed the psychological underworld (Yates, 1932). The first course in graphology, however, originated in 1968 at the New School in New York. Graphology, for the selection of personnel, particularly for banks, commenced (Olyanova, 1970).

Influential graphological schools were established by Klages (1910; 1913; 1928; 1936), Saudek (1925; 1926), and Pulver (1931), in Munich, Switzerland and Czechoslovakia,

respectively. Klages (1928) elevated graphology to scientific and governmental acceptance in Germany. Graphologists were used for vocational diagnosis and selecting soldiers for the German army.

In Europe, research into graphology by scientists like Wolff (1949) was hindered by political events. He was forced to leave Germany in 1933. His continued work at the University of Barcelona was interrupted by the Spanish Civil War in 1936. His documentation was destroyed by the bombing of Madrid in 1937, and he had to start from scratch in the United States of America. His enthusiasm was dampened by "the exaggerated scepticism of scientists who expect from handwriting less than from any rat running blindly through a maze, as with the exaggerated expectations of laymen who expect everything from handwriting analysis" (Wolff, 1949, p. xii). From 1940, the war interfered with the research. Wolff (1949) introduced the notion that writing may be a symbol of a hidden message—unknown even to the writer—emanating from the unconscious. It was indicated that the individual signature is the personal symbol of the individual.

The link between handwriting and emotions was established in Roman's (1952) conclusion that handwriting is the output of psychomotor energies.

### **3.1.2 DEFINITIONS OF GRAPHOLOGY**

Writing is one of the most complex human activities (Greene & Lewis, 1980; Sarah, 1988). It is based on hereditary characteristics and mental factors (Wolff, 1949), and is dependent on the acquisition of speech (Singer, 1974). Writing has an unconscious element (Mendel, 1975), and is influenced by inner conflicts and psychological traits (Hartford, 1989). There is a conscious element (Mendel, 1975) based on learning (Nash, 1988). Learning starts with a copybook writing exemplar (Manetti, 1988). Individual style intervenes between the mental effort of looking at the ideal form and the physical construction of the writing (Van Eeden, 1992). The arm, hand (Holt, 1965), fingers (Mendel, 1975) and even sometimes foot or toes (Briault, 1988), are levers that move the pen, prompted by impulses from the cerebral cortex through the central nervous system (Mendel, 1975). The writing, comprising strokes and shapes



(Graumann, 1983), is the only permanently recorded movement expressed by an individual (Hopper & Stanford, 1992; Singer, 1974). It is a graphic record (Sarah, 1988) and representation of behaviour (Nash, 1988).

Writing is indicative of personality attributes (Wellingham-Jones, 1987), interpreted by a graphologist who makes deductions (Hopper & Stanford, 1992) from the unique arrangement of shapes and patterns (Greene & Lewis, 1980; Singer, 1969). There is agreement on the basic features of writing that are relevant for the analysis (Klimoski & Rafaeli, 1983). Writing analysis is a projective test, employed by clinical psychology and psychiatry, in which personality is projected or expressed as an individual response to environmental stimuli (Ave-Lallemant, 1982; Crumbaugh, 1977). There is agreement on the basic features of handwriting that are relevant for analysis (Klimoski & Rafaeli, 1983). Graphology rests on the principle that handwriting is unique, continually changing, yet retaining its consistency of expression (Roman, 1952). Information that can be deduced from handwriting includes temperament, mental traits, social traits, work traits and moral traits (Curren-Briggs, Kennett & Paterson, 1971)— through evaluating 12 factors (Paterson, 1976), each of which presents a scale of values resulting in a broad personality profile.

A succinct definition of graphology for the purpose of this research is that it is deducing personality characteristics from writing as a graphic representation of behaviour.

### **3.2 RELEVANT EXISTING GRAPHOLOGY MODELS**

Models pertaining to graphology span a continuum from holistic to analytical approaches:

- 1 Holistic models stem from the Gestalt school, with predominantly German proponents. The proposal is that graphology should integrate information derived from individual strokes, through applying judgement and intuition (Satow & Rector, 1985; Taylor & Sackheim, 1988). Personality is revealed through uncovering the pattern in the writing (Roman, 1952). Graphological methods which accord with this approach are sorting and holistic matching (Birge, 1954).

This involves a judgmental interpretation of the writing and matching the scripts to an impressionistic account of personality. A variation on this theme is holistic correlation, which involves an impressionistic interpretation of the writing, correlated with a quantitative assessment of personality (Eysenck & Gudjonsson, 1986). Applying intuition as a method relies on the subjective ratings of one or more specified traits and comparing these with an independent measure of this trait (Secord, 1949). LeCerf (1988), for example, established correlations between graphic signs and Jungian functions. A misgiving raised by Van Eeden (1992) is that no single feature in a handwriting means anything by itself, as each feature has a range of interpretations which will be amplified, moderated or negated by the other features. In matching, the criterion for validity is that only chance matches would occur if the scripts do not reveal the personalities of the writers (Birge, 1954). A further disadvantage of the matching method is the lack of independence of events. This means that when one match has been made, the possibilities for the remaining trials are reduced and the probabilities are changed (Satow & Rector, 1985). Matching is criticised for providing little insight into the actual clues used in the analysis, and is weak in satisfying scientific criteria (Williams, Berg-Cross & Berg-Cross, 1977). Further disadvantages relate to the fact that the matcher must be acquainted with all ratees, thereby limiting the sample size. Any statistical index which is built into the procedure will have low power, and the formal matching decision does not reflect the doubts and hesitations of the rater (Nevo & Benitta, 1993). A study designed to overcome the drawbacks associated with a single hit-or-miss matching approach (Gillett, 1985) proves that graphological reports match impressions held by other people better than chance. Nevertheless, Nevo (1989) concludes that validity is not high enough to warrant the use of graphology as a single psycho-diagnostic tool.

- 2 A metaphysical approach is evident in graphology as a general theory of expression (Klages, 1936). This has been criticised by Singer (1969) as displaying a limited knowledge of the peculiarities of national characters, confining writings to German and disregarding Freudian and other schools of thought. Klages (1910; 1913; 1928), therefore, misses the unconscious as the

connection between graphology and modern psychology. However, Jung (1974) underlines the notion that archetypes surface as symbolism expressed in writing (Pulver, 1931). This proposition links graphology and unconscious processes (Singer, 1969).

- 3 The trait school, which originated in France, focused attention on individual graphological attributes (Satow & Rector, 1985) and inspired grapho-analysis (Taylor & Sackheim, 1988) as the evaluation of writing strokes—in preference to letter formations (Galbraith & Wilson, 1964). The result is that the specifics are evaluated independently from the whole. Grapho-analysis ignores the context (Roman, 1952). It is rejected as a physiological and psychological diagnostic tool because the observations are too superficial (Scanlon & Mauro, 1992). Reducing individuals to lists of traits also diminishes the gestalt (Crumbaugh, 1977). Trait sign studies measure specific handwriting signs, and relate these to personality traits which have been assigned quantitative values (Birge, 1954). This accords with the methodology on which the 7GFS is based. The most extreme form of grapho-analysis (Satow & Rector, 1985) is computerised graphology, where the computer recognises and adds the symbols in the writing. Mechanical analytical trends are evident in devices and instruments to measure writing attributes, including pressure, speed, size and width of letters. Pressure refers to point pressure and grip pressure. Point pressure is the degree of pressure exerted against the paper. Grip pressure is that which is exerted on the writing instrument. Although the pressure can be measured simultaneously, oscillographic curves have to be recorded as two separate tracings. Point pressure measuring devices are typically sensitive tables with a recording device. Alternatively, pressure is measured through the pen or pencil point (Fluckiger, Tripp & Weinberg, 1961). Katz (1948) developed a scriptochronograph to measure writing speed. Photographic and cinematograph equipment devices achieve accuracy in observing writing movements (Fluckiger et al, 1961). Some of the factors—for example, pressure—can be measured with a high degree of accuracy either by means of instruments like the graphodyne or because there is widespread acceptance that normal letter size is 3mm (Wellingham-Jones, 1989).

- 4 The analytical approach involves the measurement of graphic signs to infer personality (Keinan & Eilat-Greenberg, 1993) through quantitative assessment of traits, converted into personality assessments on the basis of some kind of formula. It is also possible to correlate the characteristics with a personality assessment which can, in need, be combined and related to an external criterion. The Lewinson-Zubin Scales (Lewinson & Zubin, 1942; Secord, 1949), Roman-Staempfli Psychogram (Roman, 1968), Wittlich Character Diagram (Jacobs, 1970), and the 7GF (Elliott, 1994) provide examples of analytical scales. The Lewinson-Zubin Scales rely on the assumption that ratios of the characteristic are more important than the mere presence of the attribute (Secord, 1949). Components which are significant to the analysis include form, vertical, horizontal and depth movements. Form components include the extent of ornamentation versus simplification, contraction, thinness versus broadness, sharpness versus pastiness, and tension versus flabbiness. Contraction refers to amplification of contours and connection. The vertical component includes height of the middle zone, proportion of upper, middle and lower zones, direction, fluctuation and space between lines. The horizontal component includes space between letters, breadth of letters, direction and fluctuation of slant, left versus right tendency, distance between words, and breadth of margins. The depth component refers to pressure increase, decrease and control, as well as degree of connection. From an analytical point of view, the form component relates to the integrative factor of the personality, specifically performance, creativity, contact, hardiness, intellectual control and coordination. The vertical component refers to organisation and rationality. This embraces self-importance, levels of aspiration, mood level, mood fluctuation and a sense of proportion. The horizontal component relates to the emotional-social sphere, including reciprocity between individual and environment, self-confidence, attitude towards the environment, introversion versus extroversion, and degree of contact with the environment. The depth component indicates the utilisation of the individual's instinctual drives, notably available energy, utilisation of energy and analytical-synthesising ability (Lewinson & Zubin, 1942; Lewinson, 1961). The Roman-Staempfli Psychogram aims to integrate distinctive elements. It is a charting system which assembles individual components of the

handwriting into syndromes, or groups of functionally related graphic indicators. The representation is circular and divided into segments. The mental characteristics are placed symbolically in the upper half of the circle, and biologically rooted characteristics appear in the lower part of the circle. In the left part of the circle, introversion, the self, relationships with the mother figure, and the past are represented. In the right part of the circle, extroversion, the world, father, future and release are represented (Roman, 1968). The Wittlich Character Diagram also provides a graphic method for drawing on script characteristics to create a profile of the writer's personality (Jacobs, 1970; Wittlich, 1940). Apart from the more formal methods, individual graphologists typically use their own worksheets and rating scales (Klimoski & Rafaeli, 1983). The 7GF differs from the other scales as it is geared towards establishing specific personality attributes for the performance of a specific job (Elliott, 1994). A criticism of the analytical method is that it ignores form and style (Eysenck & Gudjonsson, 1986). The rejection of this method also casts doubt on global approaches, according to Vestewig, Santee and Moss (1976). Blind ranking or rating of a group of scripts involves a group of judges who rate specified personality traits. Thereafter, the results are compared with scaled personality trait values (Birge, 1954). The correlations of these rankings or ratings with other scaled measures of personality are the validating criteria (Eysenck, 1948). Ranking is criticised for providing little insight into the actual clues used in the analysis, and is weak in satisfying scientific criteria (Williams et al, 1977).

- 5 Statistical analysis stems from the school of experimental psychology (Saudek, 1925). Analytic matching involves the measurement of the constituents of the writing, matched with an impressionistic account of personality. Analytic correlation is the measurement of the constituents of writing correlated with a quantitative assessment of personality. Factor analysis clusters signs that can be related to personality traits (Eysenck & Gudjonsson, 1986). This is the methodology applied in this research.
- 6 In a fusion of approaches, Lewinson (1961) indicates that Saudek (1926), Pulver (1931), and Klages (1936) combined the dynamic, symbolic and

phenomenological approaches. Dynamically, handwriting is considered to be a series of movements between contracting and releasing tendencies. A writer may contract to the point of cramp or rigidity or release to the point of expansiveness and disintegration. Alternatively, a writer may evenly balance and blend contracting and releasing tendencies in a harmonious rhythmic manner. The space symbolic interpretation of the writing field refers, in the Western school models, to the up-going and down-going movements, corresponding symbolically to the intellectual-theoretical and physical-materialistic components of personality. The left to right movements correspond symbolically from the self to others, from the private-personal to the environmental-social sphere. The depth-front dimensions refer to the pressure exerted in various degrees to penetrate the area behind the writing plane. This is what can be felt on the paper. The counterpoint to the depth sphere is the front of the paper, in terms of interrupting writing movements within or between letters, through lifting and replacing the pen. Interruptions represent the counterpoint front tendency to the depth tendency movement, with their symbolic parallels of instinctual sub-conscious drives and super-ego inclinations. Phenomenological aspects relate to the formation of letters along lines, which are modified by personal style (Lewinson, 1961).

### **3.3 A GRAPHOLOGY THEORY AND METHOD FOR USE IN INDUSTRY**

The influence of psychology on graphology is evident in a number of parallels:

- 1 Freud (1924) and Jung (1928) argue that unconscious factors inform personality. Similarly, Roman (1952) points out that graphologists reveal personality factors arising from the unconscious. Jung (1974) asserts that archetypes lodged in the unconscious are revealed through symbols in handwriting.
- 2 The technique of psychoanalysis aims to make conscious that which is unconscious. Dream analysis and free association are methods applied to uncover verbal content for analysis (Freud, 1924). The TAT is a specific test which is used to elicit unconscious material (Murray, 1938). Graphologists use

handwriting as the content for analysis, maintaining that unconscious material is projected into the writing (Roman, 1952). This implies that an intervening stimulus is unnecessary. It could be argued that handwriting is a better medium than tests like the TAT to elicit unconscious factors because of the controversies surrounding cultural bias (Fowler, 1997) and language (Wolmarans, 1997). In this respect, graphologists are specifically interested in the shapes and forms, rather than the content *per se* (Marley, 1967).

- 3 The depth proponents, Freud (1924) and Jung (1960), apply subjective judgement and intuition to evaluate the verbal output from psychoanalysis. So too graphologists, from the holistic tradition, apply subjective judgement and intuition to evaluate the written protocol (Roman, 1952). In both cases, the quality of the result must be dependent on the competence of the interpreter.
- 4 Both psychology and graphology have been subjected to calls for scientific justification. This has propelled researchers towards analysis and quantification of their results (Eysenck & Gudjonsson, 1986). The result is that 1200 personality tests have been added to the repertoire of tools available to the psychologist (Pickard, 1996b). The graphologist, in contrast, has four scales (refer section 2.2).
- 5 Both psychologists (Cattell, 1965) and graphologists (Roman, 1952) concur that there is also a conscious component to personality, which is projected in behaviour. Murray (1938) observes that specific needs can be identified through the product of personality, behaviour. Graphologists, similarly, claim that writing is an expressive movement or behaviour (Hopper & Stanford, 1992; Singer, 1974).
- 6 Cattell (1978) maintains that statistical analysis can identify clusters of personality traits. Grapho-analysis has a similar objective. The distinction lies in the fact that Cattell (1972) perceives the need to develop tests like the 16PF to uncover the personality traits of individuals, whilst graphologists assert that the writing can serve this purpose adequately (Roman, 1952). Again, the

controversies surrounding disadvantaging the already disadvantaged, through pencil and paper tests (refer section 1.2), suggest that the writing may be a better test than those instruments specifically formulated for language and implicitly culturally based responses.

- 7 Factor analysis is a specific technique believed to be of value to both psychologists (Cattell, 1978) and graphologists (Eysenck & Gudjonsson, 1986).

Furthermore, there are distinct psychological beliefs that have been adopted as basic concepts by graphologists. Some examples are:

- 1 Freud's (1961) concepts of the id, the ego and superego structures are linked to the lower, middle and upper zones of the writing. The lower zone is the area of the unconscious. It represents drives and instincts (Hill, 1981), practicality, sexuality, and physical activity (Gullan-Whur, 1986). The middle zone is the area of emotion, perception, self awareness, adaptation to reality (Hill, 1981), sociability, self esteem, handling of the immediate, and common sense (Gullan-Whur, 1986). The upper zone is the area of imagination (Hill, 1981), idealism, and aspirations (Gullan-Whur, 1986).
- 2 Jung's (1960) conception of the ego as the personal pronoun "I" is similar to the status afforded it in graphology as the ego symbol (Singer, 1969).
- 3 Freud's (1924) anal phase is held to be evident in a dirty appearance in the writing and in broad spotting in the pressure applied (Wolff, 1949).
- 4 Jung's (1971) conception of progressive and regressive development is evident in the conception of writing movements to the left, indicating introversion, and movements to the right, implying extroversion (Roman, 1952).
- 5 Energy (Murray, 1938) as a basic concept in psychology is evident in the speed of the writing, pressure and in the movements of contraction versus release (Marley, 1967). Tension is evident from angles in the writing (Wolff, 1949).



Interaction with environmental demands is deduced from factors like pressure and the utilisation of space (Roman, 1952).

The application of graphology in an industrial setting introduces specific considerations that need to be applied. The following principles serve as a foundation for the application of graphology in industry:

- 1 Job specificity through job analysis, as advocated by Muchinsky et al (1998), must be the foundation for examining writing for evidence of the desired attributes.
- 2 Specialisation implies that the industrial graphologist needs to be qualified for and competent in establishing specific, albeit limited, information about a specific person for a specific purpose, against a specific job profile. There needs to be a focus on those specific characteristics that can effectively be established from writing. The justification for this principle is that graphology has the potential to reveal information ranging from pathology (Hopper & Stanford, 1992; Kurtz et al, 1989) to illness (Roman, 1952), to credit assessment (Briault, 1993), to the full range of personality attributes and work behaviours. It is suggested that the wide scope of information expected from graphology could contribute to the disappointing research findings (refer section 1.1). The proposal that an ideal job model for a specific purpose should be developed in preference to the copy book model is based on the wide and differing range of copybook models (Amend & Ruiz, 1980). The acceptance of the copybook model as the point of departure for the analysis may be open to question.
- 3 Matching of the competence of the industrial graphologist with the depth of information that is required from the analysis is proposed as a further means for improving the predictive value of the technique. This is in line with the classification system for psychometric tests to be found in Act 56 of 1974. However, a refinement of the broad classification of graphology as a C-Level personality test (Elliott, 1994) would be to classify instruments such as the 7GFS as A-Level because of the emphasis on work performance. It would follow that

the more formula-driven the administration, scoring and interpretation of results, based on standardised criteria, the more predictable the results and the less the need for sophisticated evaluation. Analytical approaches with computerised routines place a lesser judgmental burden on the graphologist than holistic approaches which require judgement and intuition, and warrant lesser skills in graphology as a complex discipline.

- 4 Accreditation of industrial graphologists, based on the increased depth of information sought and increasing ambiguity in the analytical technique applied, would hopefully uplift the quality of graphological assessments and impact favourably on results. Highly skilled judgment calls need to be aligned to interpreting moderating or contradictory features in a writing and for extending the breadth of the information sought. This warrants a higher accreditation level than assessing attributes from an exemplar and formal guidelines.

These principles give rise to what may be termed a stepping and matching theory for writing analysis. Graphology emanates from diverse schools of thought, which influences the choice of graphological system ascribed to by the specific graphologist. The proponents of depth psychology would embrace the holistic approaches. In contrast, the trait school gives rise to analytical methodologies and customised scales. Against this backdrop it is possible to conceive of accreditation of the graphologist in accordance with the orientation of the school and inclination of the graphologist. Figure 3.3 provides a diagrammatical representation of the proposed theory. The symbolism of the inverted triangle implies the increasing levels of complexity which the graphologist would encounter as deeper and richer information is accessed. The tapering form of what would typically be the apex of a triangle denotes a reduction in specialist graphologists who would be able to access information at the deeper levels of analysis. It follows that there must also be a relationship between the speed of application and the number of reports that can be produced. Thus it is envisaged that the 7GFS could be swiftly applied to a broad population base, whilst there would be fewer graphological reports requiring richer material from the highly skilled graphologist.

As illustrated in Figure 3.3, principles from psychology can be extrapolated into graphology. Graphology can be conceived of as a sub-discipline. Parallels are provided in sub-sections 1-3:

- 1     The depth psychologists endeavour to elicit unconscious material through applying psychoanalytic techniques in the form of free association, dream analysis (Freud, 1953; Jung, 1974), or projective techniques like the TAT (Murray, 1938). The graphologist similarly utilises the written protocol to infer unconscious personality factors. In both instances the analyst endeavours to draw holistic conclusions about the personality of the individual from the verbal or written output. The complexity of this endeavour is acknowledged in the classification of personality tests as C-Level, and requiring interpretation by registered psychologists (Prinsloo, 1989).
  
- 2     At the meta-physical level, the focus is conscious expression. The B-level tests typically apply to aptitude (Prinsloo, 1989) underlining the notion that consciously expressed personality factors can be converted to productive behaviour. The analysis is restricted to patent manifestations, and does not attempt to explain the underlying causes of behaviour. The analysis by a graphologist at this level would offer general personality trends indicating preferences.
  
- 3     Cattell (1978) relies on quantification to measure traits. The reduction of characteristics to a mechanistic scale which can be administered through the medium of a computer suggests the classification as an A-level test (Prinsloo, 1989). Grapho-analysis is based on similar principles, and the formalised Wittlich Character Diagram (Jacobs, 1970), Lewinson-Rubin (Lewinson & Zubin, 1942), Roman-Staempfli Psychogram (Roman, 1968), and 7GFS would appear to offer similar classification possibilities. This is substantiated by the fact that restricted information would be offered from a limited range of characteristics. Standardisation data in case of the 7GFS facilitates the interpretation of the results.

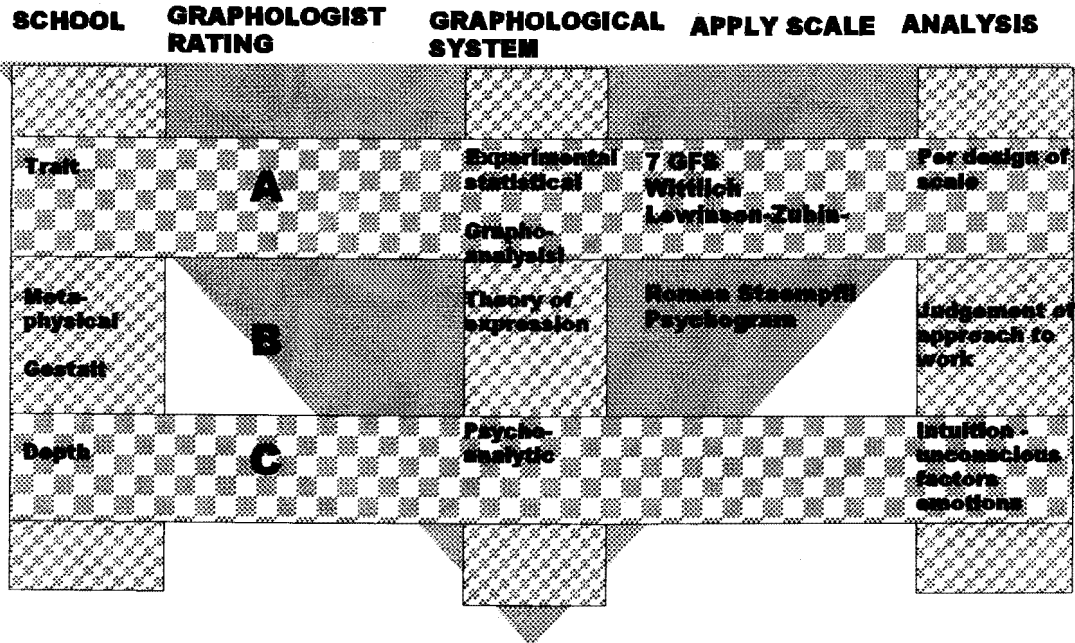


Figure 3.3 A stepping and matching theory of graphology

### 3.4 CHAPTER SUMMARY

In this chapter a conceptualisation of graphology was provided. The historical development and definitions preceded an exploration of relevant existing graphology models. A graphology theory and method for use in industry concluded the chapter. The specific aim of providing a conceptualisation of graphology has been achieved. In chapter 4 the method of investigation will be detailed.

## **CHAPTER 4**

### **METHOD OF INVESTIGATION**

The aim of this chapter is to detail the methodological procedures for standardising the 7GFS. The population and selection of the sample will precede a discussion of the measuring instruments. Thereafter, data gathering and data processing will be detailed. Hypotheses will be formulated. The chapter concludes with a summary.

#### **4.1 POPULATION AND SAMPLE**

The population comprises employees of a financial institution. The sample was drawn from this population because the 7GFS was originally developed with the intention of assessing the personality of managers for job-fit in the financial services industry (Elliott, 1994).

Purposive and quota sampling (Kerlinger, 1973) have been employed to select subjects from financial institutions in terms of the stratification criteria of position, gender and first language (Huysamen, 1987a). The levels of classification are supervisors / managers versus administrators / marketers, male, female and English, Afrikaans and Indigenous first-language speakers. Each group has no fewer than 30 cases to meet the minimum requirement for research (Huysamen, 1987b; Van den Berg, 1989). The sample comprises 360 cases. The final sample and its characteristics will be discussed in section 5.1.1.

#### **4.2 MEASURING INSTRUMENTS**

The measuring instruments include the 7GFS, TAT, SORT and 16PF. For each instrument, the rationale and development, aim, description, scales, administration, interpretation, reliability, validity, and motivation for including the instrument will be discussed.

#### 4.2.1 7GFS

The rationale and development, aim, description, scales, administration, interpretation, reliability, validity, and motivation for including the instrument follow:

- 1 The rationale underlying the 7GFS is that unconscious material is projected in handwriting (Singer, 1969). Writing serves as the projective material. The 7GFS is founded in depth psychology. However, in line with the dimensional approach, the 7GFS has been developed through establishing adjectives describing positive management behaviour and clustering these (Elliott, 1994). These adjectives were based on job analysis and on the basic criteria for assessment advocated by Baxter et al (1969) and Muchinsky et al (1998). Specific job analysis methods in Elliott's (1994) study included critical incident interviewing, as outlined by Klatt et al (1985), position analysis questionnaires, as described by Mc Cormick and Ilgen (1984), and applying the repertory grid technique for prioritisation, as advocated by Stewart and Stewart (1981). Handwriting attributes to measure the relevant personality characteristics have been determined from a literature study (Elliott, 1994). The original scale, comprising 229 handwriting characteristics, was subjected to a factor analysis. This resulted in seven factors, based on 60 handwriting attributes and complying with the quantitative requirements highlighted by Cattell (1978).
- 2 The aim in applying the 7GFS is, through handwriting analysis, to measure personality characteristics which contribute to effective functioning at a managerial level.
- 3 The 7GFS comprises a 60-item scale which describes and illustrates the handwriting characteristics and gives a weighted factor score for each item. A raw score conversion table and descriptors of the results are available. The procedures for utilising the 7GFS are detailed in Elliott's (1994) dissertation.
- 4 The seven scales are Pro-activity, Thoroughness, Purposefulness, Conventionality, Honesty, Achievement, and Precision. Pro-activity indicates

anticipation at a cognitive level, that is how to interact effectively with others. Thoroughness indicates a systematic approach to tasks with the objective of task completion. Purposefulness relates to the management of interpersonal relationships effectively as a means to an end. Conventionality refers to empathy in interpersonal relationships, and the extent to which others' points of view and frames of reference will be accepted. Honesty implies subscribing to traditional values including ethics, integrity, and loyalty. Achievement is defined as motivation to attain goals for personal fulfilment. Precision refers to accurate task execution, with attention to detail (Elliott, 1994).

- 5 The administration involves the composition of a page of original handwriting on unlined paper (Graumann, 1983; Singer, 1969) by the subject. The location in which the page of handwriting is composed is irrelevant, provided that the material is original composition and that the paper is unlined (Graumann, 1983). The choice of unlined paper and writing implements is left to the discretion of the subject. This is the material for analysis. The original page of handwriting can be delivered for analysis in person or by means of the postal service. Copies are not suitable for analysis because attributes relating to pressure cannot be determined adequately in such cases. The 7GFS specifies 60 attributes that must be rated, by category. Each attribute is described and illustrated pictorially. Raw scores are defined. A psychologist trained in graphology must score the handwritten protocol (Elliott, 1994). In this research, the TAT protocol (Lomonaco, Harrison & Klein, 1973) has served a dual purpose for the 7GFS as well as the TAT, and has been completed in formal testing conditions.
- 6 Interpretation occurs through adding the raw scores for each scale and converting these to stens by means of the raw score conversion table. Each factor is described, and the strength of the characteristic for the individual can be plotted graphically (Elliott, 1994).
- 7 Reliability, based on a standardised alpha coefficient, is available for each scale. These are Factor 1 -0,7153, Factor 2 -0,6441, Factor 3 -0,4403, Factor 4 -0,7512, Factor 5 -0,7142, Factor 6 -0,7596, and Factor 7 -0,7700 (Elliott,

1994).

- 8      Validity data has not been established and is an aim of standardising the 7GFS.
- 9      The motivation for including this instrument in this research is that it is regarded by the researcher as being the best instrument available to measure personality characteristics from handwriting in an industrial setting in South Africa.

#### **4.2.2 TAT**

The rationale and development, aim, description, scales, administration, interpretation, reliability, validity, and motivation for including the instrument follow:

- 1      The rationale underlying the TAT is that pictures depicting people engaged in an ambiguous activity (Murray, 1938) elicit projective material (McClelland, 1985) indicative of motives (Pervin, 1996). It was developed with the contribution of Murray (1938), who supports the idea that needs and environmental press will emerge. The TAT enjoys the status of being the second most popular projective technique (Hjelle & Ziegler, 1986).
- 2      The aim of the TAT is to obtain projective material for establishing motives and needs (Murray, 1938) as aspects of personality.
- 3      The full TAT consists of 30 black and white pictures, including a blank card. The stimulus value of the chosen card is believed to be paramount to the ensuing interpretation (Goldfried & Zaz, 1965). Card 1 is the most valuable for interpretations about the whole personality because the subject identifies easily with the boy, and it is innocuous (Bellak, 1975). It is the second most popular card (Hartman, 1970), and produces the richest thematic material of all the cards (Irvin & Van der Woude, 1971). The needs measured by Card 1 of the TAT in this research are based on the system of McClelland, Atkinson, Clark and Lowell (1953).



- 4 The dimensions measured by the TAT include Need for Achievement, Locus of Control, Need for Affiliation, Need for Power, Dependency, and Response to Demands:

The Need for Achievement is classified as a secondary need. It implies the desire to accomplish something difficult. This is linked to a need to master, manipulate or organise physical objects, human beings or ideas, as rapidly and independently as possible, to overcome obstacles, and to attain a high standard. (Murray, 1938) There is a desire to improve and excel, to compete and to achieve standards, and to succeed (McClelland, 1961, 1975) in pursuing goals (Howard & Howard, 1995; Mount et al, 1994). Emotional satisfaction can be derived from goal mastery (Maddi, 1976). The relevance of need for achievement in the work setting lies in the propensity to do things better, to accept personal responsibility for solving problems, to take calculated risks, to succeed at a task, and career orientation (Arnold, Cooper & Robertson, 1998; Atkinson, 1964; McClelland et al, 1953; McClelland, 1961; McClelland & Burnham, 1976; Sagie, Elizur & Yamauchi, 1998; Spangler, 1992; Stahl, 1986). The achievement need refers to two related needs. These are the attainment of success and the fear of failure (Atkinson & Feather, 1966). It is hypothesised that one of these needs is dominant (Berry, 1989). The individual seeks immediate feedback on performance to ascertain whether or not he is improving, and responds to moderate goals where there is a 50:50 likelihood of success attributable to his own actions. Challenges that do not stretch him hold little appeal—as do challenges which are too difficult and evoke a fear of failure (Arnold et al, 1998; Atkinson, 1964; McClelland, 1961; McClelland & Burnham, 1976; Spangler, 1992; Stahl, 1986). The achiever makes a successful entrepreneur, and functions effectively at an executive level (Pervin, 1996) or as a manager of a self-contained unit within a large organisation (McClelland, Atkinson & Raynor, 1974). Varga (1975) reports that achievement is associated with technical and economic success, and Spangler (1992), in reviewing the literature, found that scores on most assessments of need for achievement correlate with career success. Wheeler (1992), in research involving the three-dimensional model of achievement motivation and applying the Achievement

Motivation Questionnaire of Elizur (1979), reports that the manager has a clearer understanding of willingness to undertake a task than of the cognitive and affective implications associated with need for achievement. It correlates with independence and intellectual values (Rokeach, 1973), status / wealth, contribution to society, and professional fulfilment. Position level impacts on striving for success (Parker & Chusmir, 1991). McClelland (1961) maintains that a nation's economic prosperity depends, partly, on the level of need for achievement in its population. Need for achievement tends to predict discrepant results, based on gender. In the male, high need for achievement correlates positively with success. A female, by contrast, receives conflicting messages about the meaning of success. Career versus successful fulfilment of the wife, mother and homemaker's roles leads to mixed outcomes (Baron & Byrne, 1987). McArthur (1953) states that the response to the TAT elicits projected motivation, not mere fantasy.

Locus of control is influenced by learning a set of beliefs about life and the causes of rewards and punishment. An individual with an internal locus of control assumes that hard work, skill, acceptance of responsibility, and foresight will lead to positive outcomes (Rotter, 1954; 1966). Compared to the external, the internal is more convinced that he controls the work environment, and influences work procedures and conditions, task assignments, and relationships with co-workers (Hawk, 1989), and is aware that hard work, skill, acceptance of responsibility, and foresight lead to positive outcomes (Chance, 1965). He is more effective in interpersonal relationships (Meyer & Suttan, 1996), flexible in responding to situational demands (Cilliers & Wissing, 1993), motivated (Spector, 1982), successful (Bar-Tal & Bar-Zohar, 1977), convinced that effort leads to performance (Spector, 1982), effective in tasks requiring learning and problem-solving, where valued rewards are forthcoming (Blau, 1993; Spector, 1982), effective in decision-making (Cilliers & Wissing, 1993), suited to jobs requiring high initiative and low compliance (Hawk, 1989), aware that performance is related to job satisfaction (Blau, 1993; Spector, 1982), resistant to close supervision (Hawk, 1989), and likely to quit a dissatisfying job (Digman, 1990). Compared to the internal, the external is more rigid, dogmatic,

compulsive (Cilliers & Wissing, 1993), anxious (Blau, 1993), likely to give up in the face of competition (Spector, 1982), likely to conform (Crowne & Liverant, 1963), likely to be absent (Blau, 1993; Spector, 1982), suited to highly structured jobs requiring compliance (Hawk, 1989), inclined to be alienated and less involved in his work (Blau, 1993; Spector, 1982), and dissatisfied, believing himself to have little control over important organisational outcomes (Digman, 1990). He has probably been subjected to hostile control and criticism, and is inclined to give up in the face of competition (Davis & Phares, 1969). Conforming behaviours are likely (Crowne & Liverant, 1963). There is a positive relationship between an internal locus of control and success (Bar-Tal & Bar-Zohar, 1977).

Need for Affiliation is the desire to be liked and accepted by others and to strive for friendship. This propels the individual towards cooperative situations where relationships are dependent on a high degree of mutual understanding, and to communicating where there is low stress or limited threat involved (Atkinson, 1964; Boyatzis, 1973; McClelland, 1961; 1985; McClelland & Burnham, 1976; Stahl, 1986). The individual with a high need for affiliation performs better in groups than alone (Klein & Pridemore, 1992), and is found in service oriented jobs where he can fulfil his need to work with and help other people (Smither & Lindgren, 1978).

Dependency means a condition holding between two or more people, in which one relies on others for emotional, economic or any other support (Reber, 1986). In a work context, this would be indicative of the degree to which the individual will require support from others in the organisational environment, and relates to the interactional perspective outlined by Kruger (1980).

Need for Power is indicative of a desire to control the environment and to influence others (Steers, 1987). The concept was originated by Adler (1930) who regarded power as the central goal of all human activity. In the work context, it is indicative of superior performance and leadership qualities (McClelland, 1975; Steers & Braunstein, 1976). The power-driven individual

endeavours to make others behave in a way that they would not have behaved otherwise. He enjoys being in a position of status with authority, where he can influence others and gain prestige, sometimes to the detriment of effective performance (Atkinson, 1964, McClelland, 1961; 1975; Stahl, 1986), through impulsive actions like aggression, drinking, and extreme risk-taking (Winter & Stewart, 1978). Winter (1973) asserts that the power-driven individual calls attention to himself. A high need for power is, according to Miner (1964), a key requirement for managerial effectiveness because it is related to assertiveness (Meyer & Suttan, 1996). Winter (1973) states that a person scoring high in power motivation seeks greater visibility, and establishes himself in an influential position within an organisation. He develops networks of potential allies. He chooses occupations that enable him to direct people and to sanction the behaviour of others. He talks a lot in small experimental groups, and is rated as influential by his peers in eliciting participation and defining problems. Cummin (1967) finds that more successful executives score higher than less successful ones. Varga (1975) finds that need for power is associated with technical and economic success. Unmoderated, the power motive predicts leadership, profligate impulsive actions (Winter, 1988; Winter & Stewart, 1978), and aggressiveness (Winter, 1973) moderated by high levels of responsibility. Power has predicted success in corporate management over a period of 16 years. Responsible power involves ethical standards, accountability for consequences, and concerns for the effects on subordinates and peers (Winter, 1991). Minton and Schneider (1980) state that there are more aggressive individuals in some groups than others as a result of cultural influences. In management simulations, need for power has also been related to vulnerability, ingratiation, group-think and defective decision-making (Fodor & Farrow, 1979). Position level is believed to impact strongly on the striving for work success in those with a high need for power (Parker & Chusmir, 1991). Effective application of power in a leadership position implies reciprocal expression, evaluation, and the creation of a vision for success. Power creates the impetus for action, whilst the creation of visions releases potential to exploit opportunities (Peters & Austin, 1985). "Vision is the commodity of leaders, and power is their currency" (Bennis & Nanus, 1985, p.18). The individual with a low need for power is preoccupied with family

relationships (Parker & Chusmir, 1991).

Response to demands indicates the willingness of the individual to respond to the needs imposed by the environment. It is a predictor of interpersonal effectiveness in the work environment. Effectiveness in interaction with others is a key contributor to effective performance (Kruger, 1980).

- 5 Administration takes the form of providing the subject with a sheet of paper, a choice of writing instruments, and Card 1 of the TAT. A chart indicating the requirements "what has happened, what is happening, and what will happen in the future? – Record what the subject is thinking, feeling and doing" is provided in support of similar verbal instructions. No time limit is applied. The six dimensions are scored on a 5-point Likert type scale, as referred to by Watkins (1992), designed to reflect the intensity of the attribute in one direction or the other. A score of 3 is the midpoint, with two points on either side allowing for a judgement as to the degree to which the attribute deviates from the midpoint. In this research, the scoring of the TAT protocols was undertaken by a panel of three psychologists who were trained for this purpose. Their marking was guided by the statements presented in the protocol.
- 6 Interpretation requires determining the score from the statements in the story related to the needs. Criteria for measuring Need for Achievement include a stated need for achievement, for example, someone in the story stating a desire to reach an achievement goal, an activity to realise the achievement goal, anticipation of goal attainment, frustration or failure, or an achievement theme which is central to the story (McClelland et al, 1953). Statements in the story which suggest a strong need for achievement are variants of "he is determined to play the best solo that the audience has ever heard", "the boy will be the youngest player ever to have been accepted in that orchestra", and "he will practice until he can play the concerto better than Mozart". Statements which indicate low achievement include phrases such as "he plays only because he has to", "the boy would rather be playing with his friends", and "he can't see any purpose in this". Statements indicating an internal locus of control include

adaptations of "he knows that it his own efforts that will determine the final concerto", "he picks up the violin and practices, because no-one but him can make the sounds happen", and "the boy realises that it is his own fault that he can't yet play the music". Statements which indicate an external locus of control include modifications of "it is his teacher's fault that he can't play the piece", "his mother will send a note saying that he is sick", and "if only his father hadn't died he wouldn't be in this predicament." Statements in the story which indicate a low affiliation include permutations of "the boy can do it alone, without the help of a soul" , "he goes about executing his own plan", and "he enjoys the fact that it is his own efforts that will determine the outcome". Statements which indicate high affiliation include variations on "he can't do it without the oboist, his soul-mate in the orchestra", "his mother will be there, offering the ongoing support and encouragement she has always provided", and "his grandfather always wanted him to play the violin" (Kruger, 1980). Evidence of need for affiliation in the story will emerge from descriptions of nurturant press. This will take the form of individuals who aid the person in their efforts to achieve (Murray, 1938). Statements which indicate high dependency include variations on "the boy thinks that he will ask his teacher what he should do next", "he asks his father to repair the broken string", and "the boy can't practice until the rest of the orchestra are around". Those which indicate low scores and independence include variations on "the boy bought / made his own violin" and "he tunes the strings himself". Statements which indicate an active response to demands include variations on "the boy picks up the violin and starts playing / practising", "he repairs the broken string", and "John studies the music sheet". A passive response to demands is evident from a failure to acknowledge the presence of the violin at all, with material relating purely to the emotional state of the boy.

- 7 Projective techniques do not conform to the typical methods of establishing reliability. Breaking down responses, according to Bellak (1975), diminishes their meaningful gestalt. However, inter-rater reliability in respect of TAT protocols maintains correlations as high as 0,80 and 0,90 (Lubin, 1960; Welch, Schafer & Dember, 1961). Kruger's (1980) research quotes a reliability coefficient of 0,95 with regard to response to demands.

- 8 The TAT is not a standardised test. Nevertheless, De Ridder (1961) reported an 87% success rate in the selection of bus operators as regards accident aversion and discipline. Phelan (1962) claims a 0,41 correlation between a TAT evaluation and performance appraisal ratings.
- 9 The motivation for including the TAT in this research is, first, because as a projective technique it is professed to reveal unconscious personality factors (Murray, 1938). Handwriting is, similarly, purported to reveal unconscious personality characteristics (Roman, 1952), suggesting that it is warranted to establish whether there is indeed a relationship between the TAT and 7GFS. Furthermore, needs have been defined as relevant for the job of the manager (Elliott, 1994).

#### **4.2.3 SORT**

The rationale and development, aim, description, scales, administration, interpretation, reliability, validity, and motivation for including the instrument follow:

- 1 The rationale underlying the SORT (Louw, 1975) stems from the projective Rorschach technique (Klopfer & Kelley, 1942). The underlying assumption in this projective technique is that unconscious desires and tendencies will emerge through asking an individual to respond to the ten inkblots comprising the test. The inkblots can be regarded as ambiguous stimuli (Klopfer, Ainsworth, Klopfer & Holt, 1954), placing an individual in a situation where projection, as a defence mechanism (Freud, 1953), will be used. The Rorschach is one of the most commonly used projective techniques (Meyer et al, 1989). The original SORT was developed by Stone (1958).
- 2 The aim of the SORT is to elicit personality traits which contribute to success in a vocation. The 25 traits emerging from the SORT can be broadly classified into four groups. These are mental functioning, interests, responsiveness, and temperament. Mental functioning refers to the approach in intellectual situations, the adaptability of reasoning processes, flexibility of ideas, and the organisation

of mental processes. Interests relate both to the range of interests and the specific interest in human relations. There are eight separate measures for mental functioning, and the scores achieved by the respondent may reveal factors which may lower the intellectual functioning of which he is capable. These include low generalisation, perfectionism, poor control, and high anxiety. Low generalisation suggests that the respondent finds it difficult to concentrate on principles and theoretical implications. Perfectionism is revealed through a high score in the pedantic dimension, suggesting that the ordering of thoughts is diminished by overwhelming detail. Poor control is a consequence of an inability to concentrate. Anxiety from worry and insecurity impairs the ability to reach a logical conclusion. Responsiveness focuses on conventionalism and the tendency to be individualistic. Temperament refers to feelings compensated for in behaviour. It is proposed that compensation may be advantageous to performance (Louw, 1975).

- 3 The SORT comprises the ten ink blot cards developed for the Rorschach (Klopfer et al, 1954) as a stimulus. There is a SORT test booklet, which contains instructions for completion of the test and ten sets of three choices for each blot (Louw, 1975). A response sheet and a manual for scoring and interpretation are also available (Blaas, 1975; Louw, 1975).
- 4 The scales measure the four trait clusters. Mental functioning includes Theoretical tendency, Practical tendency, Pedantic tendency, Inductive tendency and Deductive tendency, Rigidity in thought, Structuring, and Concentration. Theoretical tendency refers to thinking in broad general terms, gaining perspective, and appreciating the relationship between parts. Practical tendency refers to thinking concretely and approaching problems from definite details. Pedantic tendency includes thinking and problem-solving with attention to small, minute and sometimes irrelevant details. Inductive tendency is logical thinking based on inferences in order to derive principles and generalise. The result is to synthesise a whole from details. Deductive tendency is the application, through logic, of existing theories, principles and generalisations to details and the analysis of relationships. Rigidity in thought is a tendency to stick to fixed



ideas, and an unwillingness to alter a point of view. Structuring refers to mental alertness, precision, and exactness in perceiving reality. It includes awareness of and conformity to the demands of the environment, and rigidity and formalised problem-solving. Concentration is the ability to pay attention to the task at hand and to avoid distractions (Louw, 1975).

Interests include Range of Interests and Interests in Human Relations. Range of interests refers to the breadth of the interests. Interest in human relations implies attention to human connections (Louw, 1975).

Responsiveness refers to Conventional and Individualistic. Conventionality is the tendency to perceive features in a similar way to others, and is an indication of empathy. An individualistic tendency embraces the perception of unique, non-conforming and eccentric elements (Louw, 1975).

Temperament includes Persistence, Aggressiveness, Social Responsibility, Cooperation, Tact, Confidence, Consistency of Behaviour, Anxiety, Moodiness, Activity Potential, Impulsiveness, Flexibility, and Conformity. Persistence is the tendency to follow a set course, and could result in stubbornness. Aggressiveness refers to aspiring to attain goals by means of accepted procedures. It is the willingness and desire to work, to accept life challenges, whilst exercising mature self-control and social conformity. Social responsibility is the willingness to be subservient, even if this is not for personal gain, whilst accepting obligations. Cooperation is the willingness to participate in group activities, and appreciation for and responsiveness to human relationships. It implies subordinating one's own immediate needs to the long-range interests of others. Tact refers to the control of impulses and biases, and implies maturity in maintaining stable relationships and balancing one's own needs with environmental realities. Confidence includes self-confidence, persistence and inner feelings of self-worth. It is the ability to withstand stress under unfavourable circumstances. Consistency of behaviour is described as stable and well-established patterns of behaviour. The behaviour that can be expected is predictable. Anxiety includes apprehension and uneasiness. There is a

preoccupation with personal well-being, emotions and sensations, coupled with feelings of insecurity and inadequacy, and constrained and erratic behaviour. Moodiness refers to extreme mood fluctuations. Activity potential is about controlled and focused emotional energy. It is characterised by following through. Impulsiveness refers to spur-of-the-moment decision-making and reactions to stimuli without forethought. Flexibility embraces general adaptability, acceptance of situations and dealing with them maturely, as well as adjusting to different situations. Conformity is the acceptance of socially accepted codes of behaviour and customs (Louw, 1975).

- 5 Administration involves providing the subject with a SORT test booklet, answer sheet and pencil. Instructions are given in line with the standard preamble. The subject is requested to complete the answer sheet, and the limit of two minutes per blot is applied. This ensures that responses are spontaneous. Scoring follows the formula applied in the SORT Manual (Louw, 1975).
- 6 Interpretation follows the instructions given in the SORT Manual (Louw, 1975).
- 7 Test-retest reliability coefficients for four groups ranges from 0,28 to 0,75 (Louw, 1975) for the SORT variables.
- 8 The concurrent validity of the SORT refers to two studies. In research conducted by Stone (1958), supervisor ratings and SORT dimensions achieved correlations between 0,16 and 0,52. In South African research, Louw (1975) reported a statistically significant relationship, at the 5% level, between the SORT variables and the occupation of the individual.
- 9 The motivation for including the SORT in this research is that it, like the 7GFS, is a projective technique which elicits unconscious material. Mental functioning is a key contributor to managerial effectiveness according to the job analysis on which the 7GFS is based (Elliott, 1994). The access to eight categories of mental functioning makes it a useful instrument for inclusion in this research. Furthermore, it measures 13 temperament traits relevant to performance in

industry. Bearing in mind the criticism of imported tests (Pickard, 1996b), it is a strong advantage that the SORT has been adapted to and standardised for South Africa by the Human Sciences Research Council (Louw, 1975). This researcher believes that particularly because of the mental functioning measurements and the South African adaptation, this is the best test available for establishing relationships between unconscious factors revealed by the SORT and the 7GFS.

#### **4.2.4 16PF**

The rationale and development, aim, description, scales, administration, interpretation, reliability, validity, and motivation for including the instrument follow:

- 1 The rationale underlying the 16PF is that information about the personality of the individual can be made available in approximately an hour, through the application of a self-report questionnaire. A unique feature of the 16PF is that it is a refinement through statistical techniques of all personality characteristics manifested in behaviour and described in a dictionary (Cattell, Eber & Tatsuoka, 1970). The 16PF is based on factor analysis, a "research tool as important to psychology as the microscope was to biology" (Cattell, 1965, p.4) (refer section 2.1.4). The sixteen clusters of personality attributes, termed factors, represent source traits which underlie and determine surface traits (Cattell, 1978). These refer to overt personality behaviour (Cattell et al, 1970), and are distinguished from the secondary traits derived in combinations from the primary source traits (Cattell, 1978). The 16 primary traits are measured on a 10-point scale across a bipolar continuum indicative of the degree to which the respondent will lean towards either disposition (Cattell et al, 1970).
- 2 The aim of the 16PF is the measurement of conscious personality factors through quantitative statistical methods (Cattell et al, 1970).
- 3 The 16PF comprises test administration forms. As recommended by Cattell et al (1970), for research purposes the 16PF Form A booklet, with instructions for

completion and 187 questions, is applied. Each question gives three alternatives (Madge & du Toit, 1991). A response sheet and interpretation manual is provided (Cattell et al, 1970). A number of publications are available to facilitate the interpretation. In this regard reference is made to Abrahams (1996); Cattell (1950; 1957; 1965; 1972; 1973; 1978; 1994); Cattell and Child (1975); and Cattell, Eber and Tatsuoka (1970; 1992).

- 4 The primary factors measured are designated by alpha characters and designated with plus or minus signs to indicate the bipolarity of the constructs. They are A- Reserved, A+ Outgoing, B- Less Intelligent, B+ More Intelligent, C- Emotionally Unstable, C+ Emotionally Stable, E- Submissive, E+ Dominant, F- Serious, F+ Enthusiastic, G- Expedient, G+ Conscientious, H- Restrained, H+ Adventurous, I- Tough Minded, I+ Sensitive, L- Trusting L+ Suspicious, Practical, M+ Imaginative, Forthright, N+ Shrewd, O- Complacent, O+ Apprehensive, Q1- Conservative, Q1+ Experimenting, Q2- Group Dependent, Q2+ Self Sufficient, Q3- Uncontrolled, Q3+ Controlled, Q4- Relaxed, and Q4+ Driven. Reserved is described as detached, critical, aloof, and stiff. Outgoing is described as warmhearted, easygoing, participating. Less intelligent implies concrete thinking and dull. More intelligent means abstract thinking and bright. Emotional instability proposes that the individual is affected by feelings, and is easily upset and changeable. Emotionally stable refers to maturity, facing reality, and calmness. Submissive means obedient, mild, easily led, docile, and accommodating. Dominant includes assertive, aggressive, competitive, and stubborn. Serious is both taciturn and sober. Enthusiastic includes heedless and happy-go-lucky. Expedient implies disregarding rules. Conscientious is persistent, moralistic, and staid. Restrained is a simile for shy, withdrawn, and threat-sensitive. Adventurous includes socially bold and thick-skinned. The tough-minded individual rejects illusions. Sensitive includes tender-minded, dependent, and overprotected. Trusting means accepting conditions. Suspicious and jealousy interact. Practical and down-to-earth are similes. Imaginative implies absent-minded. Forthright partners the description unpretentiously. Shrewd implies astute and worldly. Complacent means self-assured, placid, and secure. Apprehensive includes self-reproaching, insecure, worrying, and

troubled. Conservative implies respecting established ideas, and tolerance of traditional techniques. Experimenting is also liberal, analytical, and free-thinking. Group dependent implies a joiner or follower. Self-sufficiency includes resourceful and a preference for one's own decisions. Uncontrolled includes lax, following one's own urges, and being careless of social rules. Controlled suggests exacting will power, being socially precise, and compulsive. Relaxed is described as tranquil, torpid, and devoid of frustration. Driven includes the adjectives tense, frustrated, overwrought, and fretful (Cattell et al, 1970).

- 5 The administration takes the form of complying with the instructions for completion contained in the test booklet (Madge & du Toit, 1991). Test booklets and response sheets are provided to the respondent who is instructed to complete the test in his own time (Cattell et al, 1970).
- 6 The interpretation takes the form of complying with the procedures in the 16PF Manual (Cattell et al, 1970).
- 7 Test-retest reliability is in the range of 0,90, with variations in different factors. Factor B - Intelligence tends to fare poorly (Cattell et al, 1970).
- 8 Validity estimates include direct and circumstantial estimates. These range between 0,96 and 0,63 (Cattell et al, 1970).
- 9 The motivation for including the 16PF in this research is because, like a component of the 7GFS, it taps conscious personality factors. A part of writing is conscious and deliberate. This is comparable with the choice of answers in a self-report instrument like the 7GFS. The fact that the 16PF has been standardised for South African respondents was considered to be an advantage until Abraham's (1996) research indicated that it is unsuitable for South African conditions (refer section 1.6.2). The development methodology, applying factor analysis, has been adopted for the 7GFS (Elliott, 1994), suggesting that there may be some compatibility. Many of the attributes identified as relevant for effective performance as a manager are measured by the 16PF. Cattell's (1965)

theory has been deemed to be of sufficient significance for inclusion in this research in order to conceptualise personality (refer section 2.1.).

### **4.3 DATA GATHERING**

The TAT, SORT and 16PF require that the tests are administered in controlled conditions under the supervision of a psychologist. Group administration to no more than 10 individuals at a time was indicated. It was part of the procedural work of the psychologists of the Human Resource Development Department of the financial institution participating in this research to administer this battery of tests to the new applicant and to the individual being considered for promotion to a management position. The groups started with the completion of the TAT and then the SORT and 16PF, in accordance with the requirements laid down for these tests. In order to meet the criteria for the 7GFS, the subject was provided with unlined paper for the TAT. The testing occurred in rooms suitable for test administration in national locations at the regional offices of the financial institution involved in this research. In view of the need to meet specific criteria, many more subjects were tested than were included in the sample. There was difficulty associated with obtaining the minimum sample for the female and Indigenous-speaking management groups. This was overcome by approaching the Human Resource Department of a related division of the financial institution and requesting them to allow their managerial level staff to volunteer as participants in this research. The resultant testing, on the same basis, conducted at their premises, made up deficiencies in the sample. The collection of data for this research spanned a period of two years.

The TAT story and the SORT and 16PF answer sheets were transported to the Human Resources Development Department situated at the Head Office of the financial institution. The TAT scoring was undertaken by a panel of three psychologists, trained in the method outlined by Kruger (1980). The SORT and 16PF were scored on computerised routines (Cattell et al, 1970; Louw, 1975) developed for this purpose. The data were checked for input errors and rectified accordingly. The resultant profile formed the basis of a report for the selection, rejection and development of the individual. The applicant who did not secure employment with the financial institution

was excluded from the research sample. The TAT story which served as the protocol for the 7GFS was scored separately in the home of this researcher, in batches, over a period of time, according to the instructions for the 7GFS (Elliott, 1994). The ratings were checked by a graphologist, and any discrepancies discussed and agreement reached on the attributes. Each scoring sheet was double-checked for accuracy.

#### **4.4 DATA PROCESSING**

A database was formatted, by means of the PC Tools package (Dyson, 1990), for capturing the test scores of the four tests. Biographical data for gender, language preference, position and age, the 16 stens for the 16PF, 25 stens for the SORT, and 6 raw scores for the TAT were captured onto the database in the Human Resources Development Department situated at the Head Office of the financial institution. The input was printed out and double-checked for accuracy. The database containing the TAT, SORT and 16PF scores was copied onto a disc and from there onto the home computer of this researcher. The 7GFS scores were captured by this researcher onto the database. Capturing was double-checked for accuracy. The method was for one person to read out the scores on the input sheets, whilst another checked the computer printout. Errors in input were highlighted, rectified on the computer, and rechecked for accuracy.

The data, for the 360 respondents comprising the sample on the database, were transferred electronically online to an expert in the operation of the Statistical Package for the Social Sciences [SPSS] (Norusis, 1992), with instructions for running the various statistical procedures required for this research. These included:

- 1     descriptive statistics, including a frequency analysis with means, standard deviation, and an age analysis.
- 2     factor analysis. This is due to the sample in this research being 360 cases, whereas the original 7GFS was developed through 125 cases (Elliott, 1994). The rule is that there should be three times the number of variables in the sample (Kerlinger, 1973), in order to refine the number and nature of the underlying

measures. Principle component extraction and equamax rotation (Norusis, 1992) were chosen to arrive at the converged, rotated factor solution. The factor analysis was run twice to refine the factor structure.

- 3 Cronbach's alpha to establish the internal consistency of the scale, referring to the mean inter-item correlation within a scale, where it is assumed that the items on a scale are positively correlated with each other because they measure a common entity (Norusis, 1992). This procedure tests H1 (refer section 4.5).
- 4 stepwise regression analysis, with the seven graphology factors as the dependent variable, and the raw scores of the TAT and stens for the SORT and 16PF as a collective independent variable. Provision is made for convergence and divergence. Convergence occurs where more than a single measure supports the construct validity of a measure. Divergence occurs when two apparently similar variables both fail to support the construct validity of a measure, allowing for the discrimination of apparently similar measures, and alteration in the theory of what it is that they really measure (Kerlinger, 1973). Stepwise regression analysis is a combination of backward and forward procedures. The first variable is selected. If it fails to meet the entry requirements, the procedure terminates with no independent variables in the equation. If the first variable meets the criterion, the second variable is selected. If the second variable selected complies with the entry criterion, it also enters the equation. The first variable is examined to establish whether it should be removed. Variable selection terminates when no more variables meet the criteria for entry and removal (Norusis, 1992). This procedure tests H2 (refer section 4.5).
- 5 three-way ANOVA to establish whether observed differences are attributable to chance or to true differences between the means of the subgroup. Multiple comparison tests of this type provide protection against highlighting too many differences which may not be significant (Norusis, 1992). This procedure tests H3, H4 and H5 (refer section 4.5).



- 6 t-tests through calculating the Students t and the two-tailed probability of the difference between means (Norusis, 1992). This provides refined interpretative material for H3, H4 and H5 (refer section 4.5).
- 7 the Mantel-Haenszel test of linear association (Norusis, 1992) tests H6 (refer section 4.5).
- 8 norms calculated for the smallest, most homogeneous groups. These are based on the language differentiator. The principle is to interpret scores with due regard for the norm groups used to derive them and the purpose of the interpretation (Bartram, 1992). The United States of America 1991 Civil Rights Act prohibits score adjustments based on gender or race (Aamodt, 1996). This precedent is being followed in this research. Bands (Brown, 1994; Gottfredson, 1994), as a refinement of the norming procedures, have been calculated by combining every second sten as an average for each factor and averaging the three scores, for the 7GFS.

The resultant statistics were returned electronically. The original runs excluded seven cases, and the process was repeated to ensure that as many valid cases as possible would be included in the results.

#### **4.5 FORMULATION OF HYPOTHESES**

The formulation of the hypotheses is aimed at fulfilling the objectives of the empirical research:

- H1 - The factors of the 7GFS are internally additive.
- H2 - There are significant relationships between the factors of the 7GFS and factors in the TAT, SORT, and 16PF.
- H3 - The mean 7GFS scores will differ significantly between males and females.

- H4 - The 7GFS will differentiate between managers / supervisors and administrators / marketers.
- H5 - The mean 7GFS scores will differentiate between English, Afrikaans and Indigenous language mediums.
- H6 - The 7GFS will not be free of bias.

#### **4.6 CHAPTER SUMMARY**

In this chapter, the methodological procedures for standardising the 7GFS were detailed. The population and selection of a sample preceded the steps in the administration of the measuring instruments. Data gathering and data processing procedures were specified. Hypotheses were formulated in the penultimate section. The specific aim to standardise the 7GFS has been partly achieved by outlining the method of investigation. Chapter 5 provides the results.

## **CHAPTER 5**

### **RESULTS**

In this chapter, the results of the data processing will be provided. This includes the final sample, factor analysis, Cronbach's alpha reliability coefficients, stepwise regression analysis, three-way ANOVA, t-tests, the Mantel-Haenszel test, and norms. Thereafter the results will be discussed—in the same sequence as outlined for the data processing. The chapter concludes with a summary.

#### **5.1 REPORTING OF RESULTS**

Results relate to the final sample, descriptive statistics, factor analysis, Cronbach's alpha reliability coefficient, stepwise regression analysis, three-way ANOVA, t-tests, the Mantel-Haenszel test, and norms.

##### **5.1.1 SAMPLE**

In the final data processing, three cases were rejected because the scores were at the extreme tails of a normal distribution. This reduced the final sample from 360 to 357. The final sample is indicated in Appendix A.

##### **5.1.2 DESCRIPTIVE STATISTICS**

The descriptive statistics include means, standard deviations, and an age analysis. These are detailed in Appendix B.

##### **5.1.3 FACTOR ANALYSIS**

The 60 items comprising the 7GFS resulted in 19 primary factors. The Scree Diagram in Appendix C, plots the eigen values and illustrates the way in which the various factors account for the explained variance in the factor run. As is customary, 1,0 is

taken as the natural cutoff (Fisher, 1965), justifying the focus on the first eight factors.

The secondary factor analysis indicates the primary factors, graphological items, graphological indicators, attributes measured, factor weights, high-order weights and secondary factors, as well as the eigen value of the factors and the variance by factor. Results of the factor analysis are provided in Appendix D. Item 15 loads into both Factors II and VIII. Items numbered 46 and 47 which loaded into the original 7GFS of -0,80 and 0,80 thereby cancelled each other out. Consequently these items did not load into the secondary factor analysis and have been excluded from the new 7GFS. In secondary Factor VIII, there is no high-order weight as there is only one primary factor that comprises this factor. The structure of the factors and the number of factors have changed as a consequence of the factor analysis with a larger sample. The 7GFS scoring key therefore changes as shown in Appendix E.

#### **5.1.4 CRONBACH'S ALPHA RELIABILITY COEFFICIENTS**

The Cronbach's alpha coefficients for the 7GFS are provided in Appendix F. It will be noted that the scales range in reliability from 0,611 for Factor I to 0,111 for Factor VII. Results are not reported for matched sub-groups, because none of these differ significantly from the total group.

#### **5.1.5 STEPWISE REGRESSION ANALYSIS**

The stepwise regression analysis results for the SORT, 16PF and TAT, as independent variables, are presented in Appendix G. The significance of the inclusion of the variable and the degree of the prediction of the combined variables are reflected.

Significant relationships exist between the 7GFS and factors from the TAT, SORT and 16PF for all but Factor III. The relationships are discussed below:

- Factor 1 Task Orientation - Directive (hereafter TOD) and SORT, low Practicality (9,22\*\*) and 16PF E+, Assertiveness (8,09\*\*).

- 7GFS Factor II Task Orientation - Conscientious (hereafter TOC) and TAT high Need for Achievement (13,49\*\*) and low Need for Affiliation (9,05\*\*), 16PF M-Practical (10,52\*\*) and B+ Intelligence (9,76\*\*).
- 7GFS Factor IV Extroverted Interpersonal Orientation (hereafter EIO) and TAT low Need for Power (5,43\*\*) and high Dependence (5,85\*\*) and SORT low Flexibility (5,42\*\*).
- 7GFS Factor V Independence (hereafter IND) with TAT internal Locus of Control (6,47\*), SORT high Flexibility (5,64\*\*), and 16PF G- Expediency (5,22\*\*).
- 7GFS Factor VI Conceptualisation (hereafter CN) with 16PF O- Complacency (6,47\*\*) and G- Expediency (6,52\*\*) and SORT high Social Responsibility (6,34\*\*) and high Deduction (6,68\*\*).
- 7GFS Factor VII Openness to Experience (hereafter OTE) and 16PF Q1+ Experimenting (10,54\*\*) and O+ Apprehension (8,10\*\*) and TAT low Need for Power (6,84\*\*).
- 7GFS Factor VIII Need for Power (hereafter NFP) with TAT high Need for Power (8,89\*\*) and 16PF B+ Intelligence (8,04\*\*) and I- Tough-mindedness (9,76\*\*) and SORT low Impulsiveness (6,41\*\*).

These results confirm that the factors of the 7GFS are internally additive, and that there are significant relationships between all of the factors of the 7GFS, but for Factor III and some of the factors of the TAT, SORT and 16PF. In summary, the findings as regards to the specific hypotheses (refer section 4.5) tested through stepwise regression are:

- H1 - that the factors of the 7GFS are internally additive is supported.
- H2 - that there are significant relationships between the factors of the 7GFS and factors in the TAT, SORT and 16PF is partially supported.

### 5.1.6 THREE-WAY ANOVA

The results of the three-way ANOVA are provided in Appendix H. There are significant differences with regard to gender and the interaction of gender with language and managerial status. These are highlighted below:

- Significant gender differences are indicated with regard to Factors II TOC (4,60\*), III Emotional Stability (hereafter ES) (4,20\*), VII OTE (6,44\*), and VIII NFP (33,38\*\*).
- The interaction of gender with language reveals significant differences in Factors III ES (5,37\*\*), IV EIO (7,02\*\*) and V IND (3,30\*).
- The interaction of gender with managerial status indicates significant differences in Factors IV EIO (5,30\*\*) and VI CN (3,56\*).

The means from Appendix B indicate the specific differences for the factors that will be discussed (refer section 5.2.5). These are Factor II (21,6 males, 19,4 females), Factor III (19,4 males, females 20,8), Factor VII (25,4 males; 27,4 females) and Factor VIII (7,2 males, 4,3 females).

Significant differences with regard to position are indicated with regard to Factors VI CN and VII OTE. These differences will be discussed with reference to the t-tests (refer section 5.1.7).

Significant differences with regard to language are indicated with regard to Factors II, V and VI. The interaction of language with managerial status indicates significant difference in Factors IV EIO and VI CN. These results will be discussed with reference to the Mantel-Haenszel Test (refer section 5.1.8).

These results confirm that the mean scores for some of the factors in the 7GFS differ significantly on the basis of gender, position and language. The findings as regards to the specific hypotheses (refer section 4.5) tested through three-way ANOVA are:

H3 - that the mean 7GFS scores will differ significantly between males and females is supported.

H4 - that the 7GFS will differentiate between managers / supervisors and administrators / marketers is supported.

H5 - that the mean 7GFS scores will differ between English, Afrikaans and Indigenous language mediums is supported.

### **5.1.7 t-TESTS**

The results of t-tests are provided in Appendix I. Significant differences with regard to gender are confirmed for Factors II TOC (-2,15\*), III ES (-2,04\*), VII OTE (-2,50\*) and VIII NFP (5,80\*\*). Significant position differences apply to Factors VI CN (2,35\*) and VII OTE (2,06\*). Specific differences in the means are derived from Appendix B. These are Factor VI (15,0 managers / supervisors; 13,3 administrators / marketers) and Factor VII (27,3 managers / supervisors; 25,6 administrators / marketers). Significant language differences between English and Indigenous apply to Factors V IND (2,66\*\*) and VI CN (2,35\*), between Afrikaans and Indigenous to Factors II TOC (-2,68\*\*) and VII OTE (2,29\*\*) and English and Afrikaans to Factor V IND (2,68\*\*).

Significant differences highlighted in both the three-way ANOVA and the t-tests relate to gender for Factors II, III, VII and VIII, language for Factors II, specifically Afrikaans versus Indigenous, V for English versus Indigenous and Afrikaans, and VI for English versus Indigenous, and Factors VI and VII for managerial status.

The t-tests confirm the findings highlighted with regard to the three-way ANOVA (refer section 5.1.5). These are reiterated in reference to the relevant hypotheses (refer section 4.5):

H3 - that the mean 7GFS scores will differ significantly between males and females is supported.

- H4 - that the 7GFS will differentiate between managers / supervisors and administrators / marketers is supported.
- H5 - that the mean 7GFS scores will differ between English, Afrikaans and Indigenous language mediums is supported.

#### **5.1.8 MANTEL-HAENSZEL TEST**

The results of the Mantel-Heanszel tests are provided in Appendix J. This indicates that there is a significant difference in Factors V IND (6,4222\*\*) and VI CN (7,042\*\*). Means are derived from Appendix B. These are Factor V (18,5 Indigenous, 18,6 Afrikaans, 21,0 English) and Factor VI (13,4 Indigenous, 15,3 English), noting from the t-tests (Appendix I) that the Afrikaans language interaction is not significant in Factor V.

These results confirm that the 7GFS is not free of bias. The findings as regards the specific hypothesis (refer section 4.5) tested through the Mantel-Haenszel test is:

- H6 - that the 7GFS will not be free of bias is supported.

#### **5.1.9 NORMS**

The fact that significant differences have been found in the 7GFS factors introduces the requirement for norms. Norms for the English, Afrikaans and Indigenous groups and bands are provided in Appendix K.

The results of the data processing procedures are summarised in Table 5.1. It includes the 7GFS factors, the correlations from standardised tests, gender, language, job-related and bias differentials.



Table 5.1      **Consolidated 7GFS findings indicating standardised test correlates and differentiation based on gender, position and language**

Factor	Label	Correlates (Stepwise Regression Analysis)	Significant differentiation based on gender (t-tests)		Differentiation based on position (three-way ANOVA)		Differentiation based on language (Mantel-Haenszel test)		
			Male	Female	Administrators / Marketers	Supervisors / Managers	English	Afrikaans	Indigenous
I	Task orientation - Directive	SORT2 (-)Low practical F9.22**	None		None		None		
		16PF4 Assertive, dominance F8.09**							
II	Task orientation conscientious	TAT1 High need for achievement F13.49**	21	19.4	None		None		
		16PF(M-) Practical F10.52**							
		16PF (B+) Intelligence F9.76**							
		TAT3(-) Need for affiliation F9.05**							
III	Emo- tional stability	None	19	20.9	None		None		
IV	Extroverted interpersonal orientation	TAT4(-) Need for power F5.43*	None		None		None		
		TAT5 Dependence F5.85**							
		SORT25(-) FlexibilityF5.42**							

Factor	Label	Correlates (Stepwise Regression Analysis)	Significant differentiation based on gender (t-tests)		Differentiation based on position (three-way ANOVA)		Differentiation based on language (Mantel-Haenszel test)		
			Male	Female	Administrators / Marketers	Supervisors / Managers	English	Afrikaans	Indigenous
V	Independence	TAT2(-) Locus of control F6.47*	None		None		21	19	19
		SORT 25 Flexibility F5.64**							
		16PF(N+) Shrewd F5.19**							
		16PF(G-) Expedient F5.22**							
VI	Conceptualisation	16PF(O-) Complacent F6.47**	None		13	15	15		13
		16PF(G-) Expedient F6.52**							
		SORT16 Social responsibility F6.34**							
		-SORT 5 Deduction F6.68**							
VII	Openness to experience	16PF(Q1+) Experimenting F10.54**	25	27.4	26	27.3	None		
		16PF(O+) Apprehensive F8.10**							
		TAT 4(-) Need for power F6.84**							
VIII	Need for power	TAT4 Need for power F8.89**	7.3	4.4	None		None		
		16PF(B+) Intelligence F8.04**							
		16PF(I-) Tough-mindedness F9.76**							
		SORT24(-) Impulsiveness F6.41**							

## 5.2 INTERPRETATION OF RESULTS

The interpretation relates to the factor analysis, Cronbach's alpha reliability coefficient, stepwise regression analysis, three-way ANOVA, t-tests, the Mantel-Haenszel test, and norms. Descriptive statistics are relevant to the interpretation.

### 5.2.1 FACTOR ANALYSIS

The characteristics typically measured by the writing attributes (refer Appendix D) provide guidelines for labelling the factors. These indicators are supplemented by comments in the literature concerning the proposed factors.

#### I TASK ORIENTATION – DIRECTIVE

The characteristics measured by the writing attributes emphasise the ability to direct tasks. Leadership (Hill, 1981; Myer, 1968; Singer, 1974) is indicated. The descriptors speak of action orientation (Nezos, 1989), coordination (Branston, 1990) in seeing the whole as well as the parts (Singer, 1974), organisational ability (Branston, 1990; Nezos, 1989), a methodical approach (Branston, 1990), conscientiousness (Marley, 1967; Myer, 1968), orderliness (Branston, 1990; Mendel, 1975; Myer, 1968; Nezos, 1989), responsibility (Branston, 1990; Nezos, 1989), reliability (Branston, 1990; Myer, 1968; Singer, 1969; 1974), dependability (Olyanova, 1970), purposefulness (Branston, 1990; Marley, 1967; Mendel, 1975), determination (Myer, 1968; Nezos, 1989), tenacity (Marley, 1967; Myer, 1968), endurance (Branston, 1990; Myer, 1968), diligence (Mendel, 1975), hard, steady work (Branston, 1990; Singer, 1969), industriousness (Branston, 1990), self-discipline (Branston, 1990; Nezos, 1989; Singer, 1969; 1974), self-control (Branston, 1990; Nezos, 1989), consistency, tenacity (Nezos, 1989), independence (Hill, 1981; Marley, 1967; Mendel, 1975; Myer, 1968; Nezos, 1989), self-assurance (Branston, 1990), confidence (Branston, 1990; Mendel, 1975; Nezos, 1989), energy (Greene & Lewis, 1980; Myer, 1968), loyalty, commitment and trustworthiness (Hill, 1981). There will be clear communication of facts (Mendel, 1975), natural expression (Myer, 1968), clear thinking (Singer, 1974), and creativity (Nezos, 1989). Decision-making (Myer, 1968; Nezos, 1989) will be logical (Branston, 1990), objective (Nezos, 1989), and intelligent (Amend & Ruiz, 1980; Mendel, 1975) through using concepts in abstract thinking (Roman, 1952) and mental agility (Branston, 1990). There is an extroverted orientation (Branston, 1990; Mendel, 1975), with warmth (Branston, 1990), honesty (Hill, 1981; Nezos, 1989), truthfulness (Hill, 1981), calmness (Myer, 1968; Nezos, 1989), frankness (Hill, 1981), a direct approach (Mendel, 1975), respectfulness (Mendel, 1975), an informal attitude (Branston, 1990, p.36), good

speaking ability (Hill, 1981), and maturity. Optimism (Nezos, 1989), flexibility, adaptability (Branston, 1990), tolerance (Branston, 1990), and cooperation (Mendel, 1975) can be expected. The approach will be observant (Branston, 1990), careful (Nezos, 1989), and attentive to detail (Marley, 1967).

The leadership emphasis in this factor prompts the inclusion of specific aspects related to the cluster. It is proposed that the Factor I descriptors for the 7GFS are similar to the initiating structure management style (Hollander, 1985), with elements of what Schultz & Schultz (1998) term the authoritarian type. The leader adopting the initiating structure style ensures that people follow rules and procedures (Bass, 1990; Hollander, 1985). This leader directs and defines the work and its execution. Tasks are assigned, directed and monitored to ensure accuracy. Authoritarianism is indicated as the time and opportunity to consider the feelings of subordinates is limited. A specified amount of work must be done at a specified level of quality in a fixed period of time. Standards must be met consistently. A leader operating in this dimension is similar to the task-orientated leader in contingency theory, directive leadership in path-goal theory, autocracy in normative decision theory, and supervision in the leader-member exchange model. The authoritarian leader makes all the decisions and tells subordinates what to do. This is appropriate where stressful situations require high productivity and rapid job performance (Schultz & Schultz, 1998).

## **II TASK ORIENTATION – CONSCIENTIOUS**

The characteristics highlighted by the writing attributes reveal a conscientious approach to tasks (Hill, 1981; Marley, 1967; Myer, 1968; Olyanova, 1970). This is based on planning, an action orientation (Marley, 1967), independent coordination (Marley, 1967), ethical, rational thinking (Myer, 1968), and judgement (Hill, 1981), concentration ability (Hill, 1981; Olyanova, 1970), attention to detail (Marley, 1967), practicality (Marley, 1967), dependability (Olyanova, 1970), a positive attitude (Marley, 1967), reliability (Branston, 1990), honesty (Hill, 1981), frankness (Singer, 1969; 1974), sincerity (Hill, 1981; Singer, 1969), and impulsiveness (Olyanova, 1970).

This factor is hypothesised to align with the Big Five Model Conscientiousness Factor

which highlights achievement orientation, competence, self-discipline, striving for excellence (Costa, McCrae & Dye, 1991), a purposeful focus on a few goals, responsibility, persistence, and dependability (Digman, 1990).

### **III EMOTIONAL STABILITY**

The writing attributes emphasise emotional control, self-assurance, self-confidence, individualism (Branston, 1990), self-reliance (Myer, 1968), richness of inner values (Myer, 1968), empathy (Olyanova, 1970), tolerance (Marley, 1967; Myer, 1968), and self-discipline (Singer, 1974). There is an ability to concentrate (Amend & Ruiz, 1980; Hill, 1981; Marley, 1967; Mendel, 1975; Myer, 1968; Nezos, 1989) to be practical (Branston, 1990) and to apply reason (Marley, 1967; Mendel, 1975; Myer, 1968) through a theoretical, logical (Singer, 1969), individualistic (Marley, 1967) approach, with judgement ability and objectivity (Hill, 1981; Mendel, 1975). The approach is conscientious (Marley, 1967), accurate (Branston, 1990; Marley, 1967; Singer, 1974), attentive to detail (Marley, 1967), adaptable (Marley, 1967). There is a suggestion of ambition (Branston, 1990). The approach to others is sociable (Myer, 1968), warm and sensitive (Branston, 1990).

This factor is hypothesised to align with the Big Five Model Emotional Stability Factor. This is the opposite end of the Neuroticism continuum, which indicates that unpleasant emotions are experienced easily (Costa et al, 1991). Emotional stability includes the ability to withstand stress and a calm, enthusiastic, secure approach (Digman, 1990).

### **IV EXTROVERTED INTERPERSONAL ORIENTATION**

The writing attributes emphasise extroversion (Greene & Lewis, 1980; Nezos, 1989; Olyanova, 1970; Singer, 1969), a desire to communicate (Marley, 1967), ease of contact (Nezos, 1989), friendliness (Hill, 1981), agreeableness (Mendel, 1975), warmth (Hill, 1981), frankness (Branston, 1990), receptivity (Mendel, 1975; Nezos, 1989), maturity, understanding of others (Marley, 1967), observance (Branston, 1990; Hill, 1981; Mendel, 1975; Singer, 1969), self-esteem, self-assurance, confidence (Branston, 1990), a firm, well-balanced outlook (Marley, 1967), self-reliance (Branston, 1990;

Marley, 1967; Mendel, 1967; Myer, 1968), individualism (Amend & Ruiz, 1980; Branston, 1990; Marley, 1967; Myer, 1968), sensitivity (Amend & Ruiz, 1980), a social orientation (Branston, 1990; Marley, 1967; Myer, 1968; Olyanova, 1970), social ease (Marley, 1967), sociability (Greene & Lewis, 1980; Hill, 1981), spontaneity (Branston, 1990; Marley, 1967; Mendel, 1975), empathy (Marley, 1967), cooperation (Hill, 1981; Marley, 1967; Myer, 1968), attentiveness (Mendel, 1975), sincerity in females (Mendel, 1975), compliance (Roman, 1952), and honesty (Hill, 1981). There is a suggestion of action orientation (Mendel, 1975; Nezos, 1989), planning ability (Marley, 1967; Myer, 1968), a sense for calculation and strategy (Marley, 1967), concentration ability (Singer, 1974), consequential thinking (Myer, 1968), systematic thinking (Marley, 1967), deductive reasoning (Marley, 1967; Nezos, 1989), a logical approach (Branston, 1990; Mendel, 1975; Nezos, 1989; Marley, 1967; Myer, 1968; Singer, 1969; 1974), productive intelligence (Myer, 1968; Nezos, 1989), shrewdness (Marley, 1975), a good memory (Amend & Ruiz, 1980; Nezos, 1989; Singer, 1969; 1974), use of concepts in abstract thinking (Marley, 1967; Myer, 1968), creativity (Amend & Ruiz, 1980), imagination (Branston, 1990; Marley, 1967; Singer, 1974), practicality (Branston, 1990; Marley, 1967; Myer, 1968), a concern for future goals (Amend & Ruiz, 1980; Marley, 1967), organisational inclination (Marley, 1967), activity (Branston, 1990; Marley, 1967; Myer, 1968), action orientation (Nezos, 1989), drive (Branston, 1990), ambition (Mendel, 1975), purposefulness (Branston, 1990; Marley, 1967), energy in females, optimism in males, industriousness, independence (Mendel, 1975), achievement orientation (Singer, 1974), purposefulness (Branston, 1990; Marley, 1967), commitment, devotion (Myer, 1968), impulsivity (Olyanova, 1970), adaptability (Branston, 1990; Marley, 1967; Mendel, 1975; Myer, 1968; Nezos, 1989; Roman, 1952; Singer, 1974), flexibility (Marley, 1967), persistence (Marley, 1967), perseverance (Nezos, 1989), determination (Marley, 1967), attention to detail (Mendel, 1975; Singer, 1969; 1974), thoroughness (Olyanova, 1970), and accuracy (Singer, 1969).

This is another factor which accords with the Big Five Model as described by Costa et al (1991). An extrovert is characterised by strong, fast-developing and slowly dissipating inhibitions. He is less able than an introvert to tolerate routine jobs (Melamed & Bozionelis, 1992). With regard to the self-esteem component of this factor, Brockner (1988) states that the individual with high self-esteem takes more risks, chooses

unconventional jobs, and will be popular as a manager because he tries to please others. An individual with high self-esteem will experience higher satisfaction, more motivation, and be less easily influenced by others (Aamodt, 1996). Interpersonal orientation is deemed to be important by Goleman (1995), where interdependence occurs. Relational orientation is believed to be particularly critical in South Africa, with the contemporary move towards team work and a multi-cultural work force. These include communication, interpersonal orientation, conflict resolution, and influencing capabilities, and are, according to Muchinsky et al (1998), as crucial to job success as cognitive ability.

## **V INDEPENDENCE**

The theme emerging from the writing characteristics is that the action of the individual prompts the consequences. There is a suggestion of firmly rooted convictions (Mendel, 1975), maturity (Marley, 1967; Myer, 1968), honesty (Hill, 1981), objectivity (Branston, 1990; Marley, 1967; Singer, 1974), adaptability (Nezos, 1989), practicality (Marley, 1967), action orientation (Branston, 1990) towards goals (Singer, 1974), organisation in daily routine (Roman, 1952), orderly approach (Amend & Ruiz, 1980; Branston, 1990; Marley, 1967; Mendel, 1975; Roman, 1952), consequential thinking (Meyer, 1968, p.81), coordination in seeing parts and the whole (Singer, 1969), perceptive intelligence (Roman, 1952), intelligence (Branston, 1990; Greene & Lewis, 1989; Hill, 1981; Singer, 1969; 1974), mental agility (Branston, 1990), creativity (Marley, 1967), concentration (Hill, 1981; Marley, 1967; Singer, 1969; 1974), judgement (Marley, 1967; Myer, 1968; Olyanova, 1970), logic (Branston, 1990), communicativeness (Branston, 1990), spontaneity (Hill, 1981; Mendel, 1975), reliability (Branston, 1990), purposefulness (Singer, 1974), and adaptability (Nezos, 1989).

It would seem that this factor accords with the low scoring component of the Agreeableness Factor of the Big Five Model. The individual wants to fulfil his own needs, have his own way and say, and will circumvent or change the rules to meet the situation (Digman, 1990). In contrast, the individual who scores well on the Agreeable side of the continuum is compassionate (Costa et al, 1991), considers the needs of others, and values harmony (Digman, 1990).

## VI CONCEPTUALISATION

The writing characteristics suggest that there will be a tendency to consider the practical implementation of task execution. There is action orientation (Marley, 1967), independence (Amend & Ruiz, 1980), concentration ability (Hill, 1981; Singer, 1969), judgmental ability (Olyanova, 1970), application of reason (Marley, 1967; Mendel, 1975; Myer, 1968), factual memory (Olyanova, 1970), practicality, dependability (Branston, 1990), efficiency (Amend & Ruiz, 1980), self-control, self-discipline (Singer, 1974), tact (Branston, 1990; Marley, 1967; Myer, 1968), extroversion (Hartford, 1986), and impulsivity (Amend & Ruiz, 1980).

Intelligence, according to Lord, De Vader and Alliger (1986) is correlated with perceptions of leadership. Melamed and Bozionelis (1992) maintain that a manager scores higher than the general population on intelligence. Intelligence and interpersonal adjustment are the only characteristics which, according to Heslin and Dunphy (1964), consistently relate to leadership performance. These findings can be construed positively when it is considered that the 7GFS has been developed to measure management attributes. Kenny and Zaccaro (1983) and Lord et al (1986) state that almost 100 traits have been identified in studies as differentiating leaders from non-leaders. Intelligence, dominance, and masculinity consistently relate to the emergence of leadership abilities.

Intellect refers to curiosity and openness to experience, according to the Big Five Model (Digman, 1990), and it is therefore possible that this factor could be viewed as having an affiliation with Factor VII OTE. Complex work, such as management, is said to require smart people (Howard & Howard, 1995). This necessitates the continuous ability to acquire and apply knowledge. Work in changing organisations requires higher levels of general mental ability. However, as Sternberg, Wagner, Williams and Horvath (1995) have noted, practical intelligence is more likely to be related to real-world performance. Also termed common sense, it refers to action-orientated knowledge which allows individuals to achieve goals that they personally value. Aspects of intelligence that contribute to leadership effectiveness include judgement, decisiveness, knowledge and fluency of speech (Stodgill, 1984). The strongest predictor of task performance, which



includes managerial effectiveness (Campbell, McCloy, Oppler, & Sager, 1993), is general cognitive ability (Borman & Motowildo, 1993; 1997). Cognitive skills relate to processing information in occupations, including management, where the emphasis lies in creating and dispersing information (Jencks, 1989). Hogan (1989) maintains that poor leadership is the result of cognitive deficiencies, and the inability to learn from experience or to think strategically.

## **VII OPENNESS TO EXPERIENCE**

The theme evident in the characteristics revealed by the writing attributes is that there will be openness to experience. The characteristics are receptive, tolerant, flexible, expedient (Marley, 1967), optimistic (Mendel, 1975), resourceful, adaptable (Branston, 1990), expedient, with strong convictions, mature, creative, consistent (Mendel, 1975), sensitive (Branston, 1990; Hill, 1981; Marley, 1967; Myer, 1968), attentive to detail (Branston, 1990), confident (Nezos, 1989), dependable (Olyanova, 1970), sincere (Hill, 1981), honest (Amend & Ruiz, 1980; Hill, 1981), truthful (Hill, 1981), ethical, rational thinking (Myer, 1968), and determined (Amend & Ruiz, 1980).

This factor is hypothesised to align with the Big Five Model factor of the same name. There is enjoyment of new experiences (Costa et al, 1991), innovativeness, imagination, intrigue with novelty, creativity and intellectualism (Digman, 1990).

In the contemporary working situation, developing and implementing skills is of prime importance (Muchinsky et al, 1998). A career is viewed as a process of personal development requiring lifelong learning and adaptability to change (Hall & Mervis, 1995). Foster (1989) asserts that the good leader must adapt his behaviour to meet the demands of the situation or the demands of the person with whom he is dealing. Adaptability, states Katzell (1994), is the only stable trait needed to deal with new situations. Muchinsky et al (1998) confirm that adapting to change and relating to others is as critical to job success as cognitive ability.

## VIII NEED FOR POWER

The handwriting characteristics indicate an expectation of the desire to control the environment and influence others. The approach is ethical, based on rational thinking (Myer, 1968), intelligence (Hill, 1981; Singer, 1969), mental agility (Branston, 1990), judgement (Hill, 1981), creativity, resourcefulness, adaptability (Branston, 1990), and word fluency (Hill, 1981).

Miner (1964) maintains that the need for power, sometimes included with need for achievement (Arnold et al, 1998), self-control and low need for affiliation, underlies the motivation to manage. Levels of managerial motivation are also believed to have a substantial effect on the economic performance of a nation. Carson and Gilliard (1993) state that the higher a manager's motivation to manage, the better the work performance. An effective manager has a leadership motive pattern. This is apparent in a high need for organizational power and a low need for affiliation (McClelland & Burnham, 1976; McClelland & Boyatzis, 1982). The concern is with achieving results above popularity. Tough decision-making is applied. Need for personal power—as opposed to power exercised on behalf of others—can lead to removal of the leader (Conger, 1990). Stodgill (1974) and House and Podsakoff (1979) report that a leader scores higher than a non-leader on dominance / need for power, self-confidence, energy / persistence, intelligence (Singh, 1989), and task knowledge. Need for power, coupled with sociability and need for achievement, is also relevant to the leadership role (House & Podsakoff, 1979). However, McClelland and Burnham (1976) and Boyatzis (1984) warn that a the desire to achieve does not always lead to effective managerial performance, especially in large organisations, where the individual can be more concerned with his own achievements than influencing others to do well.

In summary, five of the factors in the 7GFS are hypothesised to accord with the Big Five Model (Digman, 1990). These are II TOC which aligns with Conscientiousness, III ES, as the opposite end of the Neuroticism continuum, IV EIO which aligns with Extroversion, V IND as the opposite end of the Agreeableness continuum, and VII OTE, which aligns with Openness to Experience. Factors I TOD, VI CN and VIII NFP are additional factors in the 7GFS, justified by the fact that this Scale has been specifically

developed for management selection. As indicated, there is persuasive evidence for these factors being pertinent to effective management.

Appendix L provides the literature descriptors for each factor.

Clusters from the original 7GFS (Elliott, 1994) have found their way into the new 7GFS, as a consequence of the factor analysis with the larger sample. Appendix M provides a reconciliation of the original and new scales. In summary, Factor I TOD comprises six items from Factor 6 Achievement, five items from Factor 2 Thoroughness, and three items from Factor 3 Purposefulness. Factor II TOC comprises four items that were part of Factor 4 Conventionality, and five items randomly from other scales. Factor III ES consists of six items from Factor 1 Pro-activity and one item from Factor V. Factor IV EIO comprises three items from Factor 1 Pro-activity, two each from three other factors and one from another. Factor V IND comprises three items from Factor 3 Purposefulness, and two from Factor 6 Achievement.

### **5.2.2 CRONBACH'S ALPHA RELIABILITY COEFFICIENTS**

Factor I at 0,611 is considered to be very high against the British Psychological Society quoted values of 0,35 for personality questionnaires (Fowler, 1997). Factors II and VIII, at 0,308 and 0,302 respectively, are higher than the remaining values. Cattell (1978) maintains that there should not be an expectation of high reliability with short scales, along with good construct validity.

### **5.2.3 STEPWISE REGRESSION ANALYSIS**

From the results of the stepwise regression analysis, it can be concluded that the 7GFS has content validity. Muchinsky et al (1998) assert that it is unusual to report single validity coefficients in excess of 0,50. In this regard it should be noted that Factor I TOD is high at 0,61. The specific correlations, or lack thereof, in the case of Factor III are discussed hereunder.

## **I TASK ORIENTATION – DIRECTIVE**

The Factor I correlations are low Practical from the SORT and Assertive, Dominance from the 16PF. These are discussed in sub-sections 1 and 2:

- 1 The low Practical SORT loading is in line with the leadership emphasis. The suggestion is that the high scorers would prefer the practical application to be through others, rather than being personally responsible for the application of prescribed routines. Practicality is valued when serious concrete problems must be addressed. However, excessive pragmatism can lead to stagnation and lack of creativity, which ultimately have a negative impact on performance, according to Billings, Guastello and Rieke (1993).
- 2 The 16PF Assertive, Dominance correlation is consistent with perceptions of leadership (Lord et al, 1986) and the findings that a manager scores higher than the general population on dominance (Melamed & Bozionelos, 1992). This is also explained as the enjoyment of controlling and criticising others, being in command, rising to challenges, and feeling superior to others (Karson & O'Dell, 1974). This factor is believed to be formed by hereditary traits, and discriminates between genders (Cattell et al, 1992). The dominant individual is believed to be concrete in his thoughts, and is unimaginative. The female, in contrast to the male, is self-disciplined, closed-minded and dependent (Billings et al, 1993). The gender discrimination is not substantiated in this research, presumably because females showing typical female characteristics are not considered for management. There is a positive correlation between dominance and the Managerial Motivation Questionnaire (Engelbrecht, 1994). Orford (1986) claims that the individual in a status position displays friendly-dominance no matter what the stimulus. Threats to status can lead to hostile-dominant behaviour. Hostile-submissive behaviour elicits a friendly-dominance response. The low scorer is submissive, unsure, modest, retiring, complacent, meek, quiet, obedient, lighthearted, cheerful, timid and conventional (Karson & O'Dell, 1974).

## **II TASK ORIENTATION – CONSCIENTIOUS**

Factor II correlates are the TAT high Need for Achievement, 16PF Practical and Intelligent, and the TAT low Need for Affiliation. These are discussed in sub-sections 1 to 4:

- 1 The relationship to Need for Achievement strengthens the proposal that this Factor is similar to the Big Five Model Conscientious factor (refer section 1.4.2).
- 2 The 16PF Practical dimension is a logical correlate for conscientiousness. A relationship between practicality and the Managerial Motivation Questionnaire is confirmed by Engelbrecht (1994).
- 3 Intelligence, according to the 16PF, includes general mental capacity, insight, the ability to learn fast, to be intellectually adaptable, concerned with intellectual interests, and have good judgement, high morale and perseverance (Cattell et al, 1992), which aligns well with 7GFS Factor II. Singh (1989) confirms that there is a significant relationship between need for achievement, intelligence and managerial success. Conceptualisation is a self-standing dimension in the 7GFS Factor V, and also features in Factor I. Dunn, Mount, Barrick and Ones (1995), link mental ability to conscientiousness, in their discussion of the Big Five Model, referred to by Digman (1990). The less intelligent individual has a lower mental capacity, is unable to deal with abstract problems, is disorganised, exercises poor judgement, has lower morale, and gives up easily (Cattell et al, 1992).
- 4 Low Need for Affiliation, from the TAT, is a contributor to what McClelland and Burnham (1976) refer to as the leadership motive pattern. A further contributor to the leadership motive pattern is Need for Power (refer Factor VIII NFP). The better work performance is prompted by a manager's motivation to manage (Carson & Gilliard, 1993). The concern is with achieving results more than being liked and implies tough decision-making. A high degree of self-control is a further contributor to success, and results in promotions (McClelland & Boyatzis, 1982). However, Need for Affiliation has proved to be a controversial concept,

with Cummin (1967) finding that there is a positive, if non-significant, relationship between the affiliation motive and executive success. Yet Cornelius and Lane (1984) report that affiliation motivation is positively related to managerial success. The fact that low need for affiliation is indicated in this factor suggests that effective planning could lead to the assignment of unpopular tasks, and that a need to please would be a secondary consideration.

### **III EMOTIONAL STABILITY**

The lack of correlation could be explained by Ronan, Date and Weisbrod's (1995) research. They maintain that it is difficult to establish construct validity, especially when dealing with covert variables. The composition of Factor III can be regarded as covert. However, it has been suggested (in section 5.2.1) that there is a link between this factor of the 7GFS and the Big Five Model referred to by Digman (1990). The Regulatory Theory of Temperament instrument measures a dimension termed Emotional Reactivity (Strelau, 1983). This comprises both sensitivity and endurance. It is based on the proposition that there will be a tendency to react intensively to emotion-generating stimuli through high emotional sensitivity and low emotional endurance. Emotional characteristics expressed in temperament theories have a long history (Strelau & Zawadzki, 1995), and are generally conceived of in negative terms (Buss & Plomin, 1984), focusing on specifics like neuroticism (Eysenck, 1948; Eysenck & Eysenck, 1985). Neuroticism is believed to contribute to anxiety in the 16PF (McCrae & Costa, 1986; 1997; McCrae, Costa & Journal, 1987). This is unconfirmed in this set of results, strengthening the proposal that it may be a new construct. The fact that this factor is irrelevant to job performance has been explained by Mount et al (1994) in the suggestion that those who are not high on this factor would not retain their jobs. However, Bass (1981) states that emotional balance and control are leadership attributes which contribute to effectiveness.

### **IV EXTROVERTED INTERPERSONAL ORIENTATION**

Factor II correlates are the TAT low Need for Power and high Dependence, as well as the SORT low Flexibility. McCrae and Costa (1986) and McCrae et al (1987) report a

correspondence between the 16PF Extroversion Factor and the Big Five Model Extroversion Factor (Digman, 1990). As would be expected, in this research the relationship has not been confirmed. The TAT and SORT relationships are discussed in sub-sections 1 to 3:

- 1 The opposing loading for Need for Power, from the TAT, appears to be valid in light of the negatives associated with power (refer section 4.2.2).
- 2 Dependence, from the TAT, would seem to accord well with interpersonal effectiveness, which is implied in extroversion. Muchinsky et al (1998) state that relational skills are crucial in South Africa, with the contemporary move towards team work and a multi-cultural work force. According to Billings et al (1993), the authoritarian individual is dependent, controlled, and displays tough poise.
- 3 The negative Flexibility loading, from the SORT, supports a theme for the more effective interpersonal relationships to be based on consistency in behaviour. This is hypothesised to build trust in subordinates.

## **V INDEPENDENCE**

The Factor V correlates are the TAT Internal Locus of Control and 16PF high Flexibility, Shrewdness and Expediency. These relationships are discussed in sub-sections 1 to 4:

- 1 The correlation between the TAT internal Locus of Control (refer section 4.2.2) and the 7GF Independence Factor is plausible.
- 2 The loading on the SORT high Flexibility relates to adaptability, construed, by Katzell (1994), as the willingness to experience new situations. Foster (1989) comments that adaptability is the only stable trait needed by good leaders, who will then change to meet the demands of any situation. Muchinsky et al (1998), too, maintain that job success is contingent on adaptability. It would seem justified that this dimension loads into the Independence Factor of the 7GFS.

- 3 The 16PF Shrewdness definitions include calculating, socially alert, insightful, polished, socially aware, emotionally detached, disciplined, artful, aesthetically fastidious, insightful regarding self and others, ambitious but insecure, and smart in cutting corners (Cattell et al, 1992), and would appear to link well with this factor. A person scoring high in shrewdness would be expected to lead a group towards achieving constructive group solutions to achieve goals, underlining the essence of management. This description accords well with the Independence label for Factor V.
- 4 The Expediency pole is the low end of the 16PF Conscientious factor. Descriptions (refer section 4.2.4) include fickle, frivolous, self-indulgent, slack, indolent, undependable, and inconsiderate of obligations to others (Cattell et al, 1992). The low score applies to a radical individual who persists in terms of his own frame of reference (Karson & O'Dell, 1974). This justifies the assertion (refer section 5.2.1) that the 7GFS Independence Factor is the opposite end of the Big Five Model (Digman, 1990) Agreeable scale.

## **VI CONCEPTUALISATION**

Factor VI correlations are the 16PF poles Complacent and Expedient and the SORT dimensions high Social Responsibility and high Deduction. The relationships are discussed in sub-sections 1 to 4:

- 1 The 16PF Complacency definition (refer section 4.2.4) can be expanded to include resilient, cheerful, expedient and insensitive to the approval or disapproval of others, does not care, fearless and given to simple action. Low scores can be expected in a sales manager (Cattell et al, 1992). Complacency reduces role conflict (Warr, 1983), and could be conceived of as contributing to conceptualisation.
- 2 Expedience, according to the 16PF (refer section 4.2.4), implies in relation to this factor that thinking extends beyond rules and existing frameworks (Cattell et al, 1992).



- 3 Social Responsibility, according to the SORT (refer section 4.2.3), would conceivably moderate excesses in expediency, and confirm the notion that the type of conceptualisation implied in this factor is practical common sense.
- 4 High Deduction, according to the SORT, loads in positively to a factor that focuses on a cognitive orientation.

## **VII OPENNESS TO EXPERIENCE**

Factor VII correlations are the 16PF Experimenting and Apprehensive dimensions and the TAT low Need for Power. These are discussed in sub-sections 1 to 3:

- 1 The high Experimenting scorer, according to the 16PF (refer section 4.2.4), is also well-informed, and keen to experiment with new ideas and to avoid moralistic judgements. He opposes customs and tradition, and leads and persuades others (Cattell et al, 1992). He can be aggressive, radical and is not concerned about trampling on others. In group discussions, he can contribute critically (Karson & O'Dell, 1974). McCrae and Costa (1986; 1997) report that there is indeed a correlation between the 16PF Experimenting factor and the Big Five Model Openness to Experience.
- 2 Apprehensiveness (refer section 4.2.4), in terms of the 16PF, seems to be an effective contributor to the Openness to Experience factor of the 7GFS. A calm, relaxed approach may serve to limit the experience of learning from the environment.
- 3 Low Need for Power (in section 4.2.2), from the TAT, seems to be an appropriate correlate with Openness to Experience. A key requirement for the individual driven by a high power need is to control the environment (Adler, 1930; McClelland, 1975; Steers, 1987), which could mitigate against being open to experience.

## VIII NEED FOR POWER

Factor VIII correlations are the TAT high Need for Power, the 16PF more Intelligence and Tough-mindedness dimensions, and SORT low Impulsiveness. These are discussed in sub-sections 1 to 4:

- 1 A high Need for Power (refer section 4.2.2), from the TAT, is an appropriate correlate with Factor VIII of the 7GFS.
- 2 Intelligence, from the 16PF, also loads into Factor II of the 7GFS. As a correlate to Need for Power, House and Podsakoff (1979) report that a leader is likely to score higher than others on dominance, need for power, and intelligence (Singh, 1989).
- 3 Tough Mindedness (refer section 4.2.4), according to the 16PF, includes expecting little, unsentimental, accepting responsibility, hard to the point of cynicism, giving few artistic responses, yet not lacking taste, unaffected by fancies, acting on practical, logical evidence, sticking to the point, and failing to dwell on physical disabilities. Tough, masculine, mature, and realistic are key descriptors (Cattell et al, 1992). It implies the ability to convey unpopular decisions, and would appear to be a meaningful correlate with the 7GFS Need for Power.
- 4 Low Impulsiveness, from the SORT, would appear to strengthen the notion of strategies to control the environment underlined in the power motive (refer section 4.2.2). Strelau and Zawadzki (1995) identify briskness as a component of impulsiveness. Briskness is the tendency to react quickly and to shift easily in response to changes. It would seem that the low end of this dimension is an effective correlate with a need for power, where it could be envisaged that the individual with this need would plan to secure power (Winter & Stewart, 1978).

Appendix N provides a consolidation of the characteristics derived from the writing and literature for the 7GFS, adding the significant correlates from the regression analysis.

**5.2.4 THREE-WAY ANOVA**

The level of significance denotes whether a difference is sufficiently meaningful to warrant attention (Kerlinger, 1973). The flagged items in the results imply that the 7GFS has differential validity. However, as Aamodt (1996) states, the results would be more valid for one group than another, and recommends that if this occurs, separate regression equations can be used for the different groups. Another solution is the application of norms, as proposed by Donnoe (1986), for different groups. In this research, the norm approach will be applied (refer 5.2.7).

Gender differences have been flagged for Factors II, III, VII and VIII. Background information precedes the discussion of specific findings with regard to the scales. The specifics are discussed in sub-sections 2 to 5:

- 1 Historically the female has been disadvantaged in employment opportunities and experience (Larwood & Wood, 1977; Ohlott, Ruderman & McCauley, 1994; Powell & Butterfield, 1994), enjoying fewer developmental opportunities (Ireson, 1976; Van Velsor & Hughes, 1990) than the male. Worldwide, the number of women in management positions is disproportionately low (Adler, 1993; Erwee, 1989; Greenberg & Baron, 1997; Schultz & Schultz, 1998). The perception is that managerial characteristics are like the characteristics of typical men (Pfeifer & Shapiro, 1978; Schein, 1975; Schein, Mueller & Jacobson, 1989; Steinberg & Shapiro, 1982). However, Day and Stodgill (1972), Eagly, Karau and Makhijani (1995), and Melamed and Bozionelos (1992) report that there is no difference in leadership exercised by men and women, or in potential for management (Bass, Krussell & Alexander, 1971; Dobbins, Long, Dedrick & Clemons, 1990). This is perhaps evident in the fact that there is no significant difference in Factor I TOD. A female is not less dominant, confident or goal-directed than a male (Bartol & Martin, 1986; Catalyst, 1986; Dion, 1985; Hollander & Yoder, 1980). Also consistent with this research, Bartram (1995) reports that there is no gender difference in extroversion, the 7GFS Factor IV.
- 2 Factor II TOC indicates that males score better than females. This is the

converse of the findings of Melamed and Bozionelis (1992), and contrary to the Big Five Model (Digman & Takemoto-Chock, 1981; Digman, 1990) which asserts that studies in Russia, Canada, Hong Kong, Poland, Germany and Finland revealed no gender differences (Paunonen, 1996). Factors that load into this 7GFS factor, according to the stepwise regression analysis, include low Need for Affiliation and Need for Achievement (refer section 5.1.3). The higher mean score for males is consistent with the findings of James, Lewkowicz, Libhaber and Lachman (1995) that in his middle years a male has a stronger need for affiliation than a female. However, Need for Achievement in a male equates with success, as a female receives conflicting messages about achievement because of the conflicting roles of wife, mother and homemaker (Baron & Byrne, 1987). The influence of Need for Achievement in 7GFS Factor II is assumed to be a contributor to the gender difference.

- 3 In Factor III ES, females achieve higher scores than males. The difference may be accounted for by the fact that a female is more likely to use a consideration style and less likely to use an initiating structure than a male (Eagly & Johnson, 1990). These differences are in line with findings that the female is more socially conscious, mature and integrated than a male (Sen & Seth, 1992), and that a male, according to the Ray Balanced F Scale, is insensitive when contrasted with a female (Billings et al, 1993). Melamed and Bozionelis (1992), however, report that tension and emotional instability increase as a female manager reaches higher job grades. A female is more tender-minded, sensitive and emotional than a male (Bass, 1981). In a South African study, 65% of White males perceive that a female allows emotions to influence managerial behaviour more than a male does (Human & Allie, 1988). It is hypothesised that the difference in this research is related to the fact that only the female who is emotionally controlled would be considered for inclusion in the management group. Emotionality, therefore, serves as an unstated screening hurdle.
- 4 In Factor VII, a female is more open to experience because she is more easily influenced than a male. This is said to be a function of being encouraged to be dependent on a male, which also makes her less self-reliant (Arnold et al, 1998)

and less independent. These findings are, however, contrary to research involving the Ray Balanced F Scale in which the female has been found to be more closed-minded than a male (Billings et al, 1993). However, research involving the Big Five Model finds that there are no gender differences (Paunonen, 1996).

- 5 In Factor VIII NFP, the difference between genders can be accounted for by the fact that the female is not socialised to be assertive, aggressive, or to seek power and control (McClelland & Burnham, 1976). In the stepwise regression analysis (refer section 5.1.3), the TAT Need for Power and the 16PF Toughmindedness dimensions load into Factor VIII. In a study by James et al (1995), power is cited as a strong need in the younger man. Melamed and Bozionelis (1992) find that the male scores higher in tough-mindedness. A female is higher in tender-mindedness, sensitivity, and emotionality, according to Bass (1981). An age-related reaction with gender and power is evident in that the older the female, the more she becomes a power figure within the family, taking on more of a managerial role and operating as a source of authority and wisdom. There is an increase in dominance over others, coupled with authoritarianism, increasing effectiveness and less submissiveness. As the family leader, there is likely to be a search for validation and prestige and a possibility of comments that shock and evoke strong emotions (Gutmann, 1987). The younger male has a stronger need for power than either a female in the same age group or a man at midlife (James et al, 1995). Considering that the 7GFS sample comprises 80% males who are 40 or younger, it is not surprising that there is a higher need for power in this group. Socialisation processes, according to Veroff (1957), are more important than gender for the expression of power, whilst James et al (1995) maintain that there are no studies which have indicated differences in access to power. It is conceivable that the results of the 7GFS research are partly a function of the inability of the female to access power in her organisation.

### 5.2.5 t-TESTS

The interpretation makes reference to Appendix I and to the means for the different groups in Appendix B. Gender differences applying to Factors II, III, VII and VIII are consistent with and have been discussed under three-way ANOVA (refer section 5.2.6). Language differences apply to Factors II, V, and VII, and will be discussed with reference to the Mantel-Haenszel test (refer section 5.2.8). Position differences apply to Factors VI and VII. The differences in scales relating to managerial status highlight job specific validity. The position differences are discussed in sub-sections 1 to 2:

- 1 In Factor VI CN, managers / supervisors achieve the higher scores. Intelligence, which, according to the stepwise regression analysis (refer section 5.1.5), is a component of this factor, is correlated with perceptions of leadership (Lord et al, 1986) and managerial success (Melamed & Bozionelis, 1992). Managerial success implies high scholastic mental capacity and better education as contributors to that success (Singh, 1989). The fact that the manager scores higher than the general population on intelligence can be construed positively when it is considered that the 7GFS has been developed to measure management attributes. The strength of traits associated with management intensify with increased seniority as determined by job grade (Melamed & Bozionelis, 1992). Effective leadership, according to Tarazi (1990), is a function of training, experience, and conceptual knowledge. From the age analysis (refer Appendix B), it will be noted that 87% of the marketing / administrative group are younger than 40, contrasted with the supervisory / management group who represent 69% of the sample younger than 40 and who, therefore, have had fewer years in which to receive training and gain experience. The 7GFS findings are consistent with research.
- 2 In Factor VII OTE, managers / supervisors fare better than administrators / marketers. In the stepwise regression analysis (refer section 5.1.3), Experimenting loaded into Factor VII. This is consistent with the findings of Melamed and Bozionelis (1992) that higher managerial grades correlate with the experimenting scale. A manager scoring high on radicalism is found to be more

tolerant of inconvenience and change, and is more venturesome (Singh, 1989). The manager in a higher status branch office in a service-orientated organisation is reported by Cornelius and Lane (1984) to show the leadership motive pattern, based on high power and a low need for affiliation. Performance is, however, negatively associated with this pattern. These findings are, however, inconsistent with the 7GFS findings because low need for power loads into Factor VII.

#### **5.2.6 MANTEL-HAENSZEL TEST**

The language stratification introduces differences between Blacks and Whites as the majority of first-language Indigenous speakers must be assumed to be Black. In both scales the Indigenous means are the lowest of the three groups. Background is presented prior to discussing the differences in the specific Factors V IND and VI CN highlighted in the Mantel-Haenszel tests. The specific differences are discussed in subsections 2 to 3:

- 1 In South Africa, apartheid policies in the form of the Group Areas Act, the Job Reservation Act, and the Bantu education system have acted as a form of affirmative action for Whites (Mitchell, 1993), whilst black stereotypes have mitigated against individual capability (Heilman, Block & Lucas, 1992; Human & Bowmaker-Falconer, 1992; Icely, 1986). Blacks have been economically (Abedian, 1986), educationally, and organisationally (Arnold et al, 1998; Berry, 1989; Charlton, 1994; Fernandez, 1975; Galen & Palmer, 1995; Human & Bowmaker-Falconer, 1992; Potter & Alfred, 1993; Schlemmer, 1986; Thomas, 1995) disadvantaged. In this research, 93% of the Indigenous managerial population are under 40 years of age, whilst only 63% of the Afrikaans-speaking managerial group and 51% of the English-speaking managerial groups are younger than 40. It is therefore proposed that the Indigenous speakers have had less experience and probably less training than the English and Afrikaans groups which, as Tarazi (1990) states, contribute to effective leadership.
- 2 In Factor V IND, the first-language English-speakers score highest and the Indigenous lowest. These findings are believed to be a function of the

demographics of the financial institution from which the sample was drawn. It will be noted from the Age Analysis (refer Appendix B) that 59% of the first-language English managerial group is aged 41-plus. This is compared to 47% of the Afrikaans managerial group and 7% of the Indigenous group. The first language of the organisation is English, and it is probable that there is an interaction between age and experience. Thus, the English managers are more comfortable with operating independently, thus biasing the results against the less dominant groups. Tarazi (1990) confirms the effect of experience on leadership.

- 3 In Factor VI CN, the first-language English-speaking group score higher than the other groups. The hypothesis with regard to the English managerial group influencing the results by virtue of aged-based experience is also relevant to this factor. Effective leadership, according to Tarazi (1990), is a function of training, experience, and conceptual knowledge.

#### **5.2.7 NORMS**

The recommendations of Bartram (1992) have been followed in providing norms based on language for the 7GFS (refer Appendix K). Furthermore, the proposals of Brown (1994) and Gottfredson (1994) have been followed in providing bands to equalise the differences between groups highlighted by the three-way ANOVA, t-tests, and Mantel-Haenszel tests.

### **5.3 CHAPTER SUMMARY**

In this chapter, the results of the data processing were provided. Thereafter the results were discussed. The sequence that was followed for both sections was sample, factor analysis, Cronbach's alpha reliability coefficients, stepwise regression analyses, three-way ANOVA, t-tests, the Mantel-Haenszel test, and norms. This chapter achieves the specific aim of standardising the 7GFS. Appendix O provides the 7GFS Manual.



## **CHAPTER 6**

### **CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS**

In this chapter conclusions, limitations and recommendations will be presented. The chapter concludes with a summary.

#### **6.1 CONCLUSIONS**

The aims of this research have been met. The general aim, to standardise the 7GFS for application in the financial services industry in South Africa, has been met through the specific aims:

- 1 Personality has been conceptualised, personality factors have been established, and their functioning in industry has been detailed in chapter 2. The theories of the depth psychologists, Freud (1924; 1953; 1961; 1965; 1973) and Jung (1928; 1940; 1953; 1954a; 1954b; 1959a; 1959b; 1960; 1971; 1974; 1991), and the dimensional approaches of Murray (1938) and Cattell (1950; 1957; 1965; 1972; 1973; 1978; 1994), were examined under the headings definitions, structure, development, and relevant personality factors. This resulted in an explanation of the functioning of personality factors in industry at the conclusion of chapter 2. In essence, the individual whose personality predispositions have been formed in a specific social setting is required to adapt to a work subculture. The individual will demonstrate behaviour which evokes consequences and serves as input to the formation of perceptions about work. In response to repeated cycles of behaviours, the individual will form work dispositions which will inform future behaviour. The individual, as part of an evolutionary working experience, will develop unique perceptions and behaviours. In line with the views of Jung (1960) concerning a persona presented to the world, the individual can present behaviour which proves to be acceptable in certain work settings. The experience of union between individual and organisation is a function of the fit between the personal and working persona.

- 2 Graphology has been conceptualised, graphology models have been explored, and the integration of those models into a theory and method for use in industry has been detailed in chapter 3. In essence, there are a number of parallels between personality theory and graphology. Both unconscious (Freud, 1924, Jung, 1940; Murray, 1938) and conscious factors (Cattell, 1965) influence personality. Dreams and free association provide projective verbal material for psychoanalysis, as writing provides projective written material for analysis. The influence of structures identified by Freud (1961) and Jung (1928) is evident in the writing analysis methodology. It has been proposed that graphology for application in industry is reliant on job analysis and on accrediting graphologists for the use of techniques that access different levels of information. A stepping and matching theory for the application of graphology in industry has been proposed at the conclusion of chapter 3.
- 3 The 7GFS has been standardised as an instrument for application in industry. Key criteria that have been researched include repeating the factor analysis, reliability, validity, and bias. The factor analysis with the sample comprising 357 subjects transformed the original 7GFS with seven factors to eight factors. The clustering of attributes resulted in revised labels for the factors. The factors and the abbreviations which have been used are I Task Orientation - Directive (TOD), II Task Orientation - Conscientious (TOC), III Emotional Stability (ES), IV Extroverted Interpersonal Orientation (EIO), V Independence (IND), VI Conceptualisation (CN), VII Openness to Experience (OTE), and VIII Need for Power (NFP). Reliability of the scales was established through Cronbach's Alpha. Factors I, II and VII achieved reliability coefficients of 0,611, 0,308 and 0,308 respectively, with the remaining factors showing less than satisfactory results. Validity was addressed through statistics to assess different types of validity. Construct validity was established through a stepwise regression analysis. Correlations were found between TAT, SORT and 16PF dimensions on all the factors except Factor III ES. Factor III ES is hypothesised to be a new construct. Differential validity was established through three-way ANOVA and t-tests. Gender differences were revealed in Factors II TOC, III ES, VII OTE and VIII NFP. These tests were also used to establish job specific validity.

Differences between managers / supervisors and marketers / administrators were found in Factors VI CN and VIII NFP. The Mantel-Haenszel test was applied to establish freedom from bias. Significant differences, based on language, were established with regard to Factors V IND and VI CN, indicating that the 7GFS is biased in terms of language. This supports the assertion made by Muchinsky et al (1998) that within-occupation validity generalisation is probable, whilst across-occupation validity is unlikely. Norms and bands were calculated to moderate the results. It is concluded that the 7GFS is appropriate for individuals who are being considered for development into managerial positions, where the situational variable (Bem & Funder, 1978) in the financial services industry in South Africa and the managerial style accords with that in the initiating structure dimension (Bass, 1990; Hollander, 1985). The user needs to accept responsibility for the use made of test scores which, according to Biesheuvel (1987), Brislin et al (1973), and Sundberg and Gonzales (1981), are more important than the culture-fairness of a test. As no test reaches a coefficient of 1,0, the 7GFS cannot be used as the sole basis of an appointment, and needs to be used in conjunction with interviews, previous employment history, references, performance, and job simulation exercises, as recommended by Fowler (1997). Noting the proposal of England (1991), it is preferable that the 7GFS is used as part of an assessment strategy, which recognises context and incorporates interaction with the individual based on a discussion of results. Suitable contexts include development centres (Lee & Beard, 1994), team building (Hopper & Stanford, 1992), manager and subordinate relationship enhancement (Arnold et al, 1998), career and vocational counselling (Aamodt, 1996; Nathan & Hill, 1992), training needs assessment (Schneier, Guthrie & Olian, 1988) and mentoring relationships (Kram, 1985). The evolution of personality can also be monitored over a period of time (Hopper & Stanford, 1992).

- 4 Recommendations for the practice, academic and further research of graphology are provided in section 6.3.

## **6.2 LIMITATIONS OF THIS RESEARCH**

Although the general aim of the research has been met, there are limitations as regards the specific aims:

- 1 The conceptualisation of personality, establishing relevant personality factors, and defining how these determine effective functioning in industry has been based on an analysis of the depth psychologists, Freud (1924; 1953; 1961; 1965; 1973) and Jung (1928; 1940; 1953; 1954a; 1954b; 1959a; 1959b; 1960; 1971; 1974; 1991), and the dimensional approaches of Murray (1938) and Cattell (1950; 1957; 1965; 1972; 1973; 1978; 1994). It may well be that the inclusion of further personality theorists like Adler as a proponent of individual psychology theory, Erikson as a psycho-social theorist, Bandura as a social-learning theorist, Allport as a trait theorist, Kelly as a cognitive theorist (Hjelle & Ziegler, 1986) and Erikson (1958) with a developmental perspective, amongst others, could enrich the theoretical base.
- 2 With regard to the conceptualisation of graphology, exploring relevant graphology models, and establishing a theory and method for use in industry, it is evident that different groups perform differently on the 7GFS, which suggests that cultural differences, both social and in the work setting, could be explored in greater depth.
- 3 The standardisation results are deficient in some respects. The sample size could be regarded as too small, which impacts on generalisation. Samples in excess of 10 000 generalise, according to Schmidt, Gilliland, Landis and Devine, 1993. It is unlikely that so many first language Indigenous managers could be found in South Africa, and the concerns of Abrahams (1996) and the comments of Pickard (1996a) have been noted as regards transporting international tests for use in other countries. The naming of factors may be open to criticism on the grounds of subjectivity. The fact that Factor I Task Orientation - Directive reflects the initiating structure style of leadership at the positive end of the continuum could be regarded as a limitation in a time when democratic, facilitative,

empowering, and participative styles are gaining in popularity (Byron, 1995; Clarke, 1994; Greenberg, 1998; Mabey & Mayon-White, 1993). Reliability is low, which Cattell (1978) states is an inevitable trade-off in short scales. Differential validity in respect of Factors III ES, VII OTE and VIII NFP can be construed as gender bias. On the one hand, there is a body of research that suggests there is no difference between males and females (Bartram, 1995; Bass et al, 1971; Bartol & Martin, 1986; Catalyst, 1986; Day & Stodgill, 1972, Dion, 1985; Eagly et al, 1995; Hollander & Yoder, 1980; Melamed & Bozionelos, 1992). On the other, there is support for gender differences (Eagly et al, 1995; Greenberg & Baron, 1997; Human & Allie, 1988; Hunsaker & Hunsaker, 1986; Ottaway & Bhatnagar, 1988; Pfeifer & Shapiro, 1978; Saville, 1972, Seth & Sen, 1995; Spindler & Spindler, 1990; Schein, 1975; Steinberg & Shapiro, 1982) accounted for by the fact that women have been deprived of the same opportunities as males. The latter viewpoint finds support in this research. Factors VI CN and VII OTE demonstrate job-specific validity, which could also be construed as bias. Factors V IND and VI CN indicate bias on the basis of language. Norms and bands have been provided (refer Appendix K) to overcome this limitation.

- 4 With regard to the practice, and academic and further research of graphology, it is a limitation that graphology, which has so many parallels with personality assessment (refer section 3.3), retains the status of a poor relation. The consequence is a paucity of research, destructive commentary, boycotting by academic institutions, and neglect by regulatory bodies. The constructive building on themes, debate and enriching theories, evidenced in the psychological profession (refer section 2.1), is lacking in the area of graphology. It is a limitation that theories, approaches and findings must be drawn from personality theorists and personality assessment, as opposed to finding rich and relevant resources available in the specific sub-field of graphology.

### **6.3 RECOMMENDATIONS FOR FURTHER RESEARCH**

Recommendations for further research refer to the research questions (refer section 1.2):

- 1 In response to the question of the conceptualisation of personality, the relevance of specific personality factors, and effective functioning in industry, it is recommended that job analysis is conducted for those positions where personality is a key determinant of success. This would include sales, marketing, and public relations oriented positions. In this way, a series of profiles can be accumulated for application with relevant assessment procedures.
- 2 In answer to the question of the conceptualisation of graphology, the existence of graphology models, and the integration of these into a theory and method for use in industry, it is recommended that the Health Professions Council and the Test Commission regulate graphology in line with the Health Professions Act (Act 56 of 1974). It is envisaged that this will enhance the levels of professionalism of graphology practitioners and stimulate research and application.
- 3 With regard to the question of the standardisation of the 7GFS and its application in industry, it is recommended that it is applied in the financial services and related industries, where the initiating structure management style is indicated (refer section 6.1).
- 4 In connection with the recommendations for the practice, academic application, and further research of graphology, it is proposed that graphology is acknowledged as a technique which has worthy roots and distinct benefits to offer the psychological profession, generally and in industry in particular (refer section 1.1). The development and standardisation of further graphology scales against specific job definition criteria are recommended as a valuable addition to the repertoire of assessment techniques available to the industrial psychologist for application in industry. The 7GFS is proposed as a starting point for application to larger samples, in stratified homogenous groups based on criteria like age, level of education, ethnic language and geographical area, and level of management. Furthermore, academic institutions in South Africa should follow the lead of the European and Israeli universities in including graphology in appropriate curricula. In this regard it should be noted that

graphology has application in credit assessment (Briault, 1993), criminal investigations (Scanlon & Mauro, 1992), tracing embezzlers (Hopper & Stanford, 1992), jury choice (Kurtz et al, 1989), evaluating the potentially violent or emotionally unstable (Hopper & Stanford, 1992), as a clinical tool (Kurtz et al, 1989), in medical diagnosis (Roman, 1952), as an interrogation and investigation tool (Hopper & Stanford, 1992), in identifying the originators of forged documents and anonymous letters (Marley, 1967), in evaluating threatening letters (Hopper & Stanford, 1992), and as an integrity test to tap into a variety of counterproductive behaviours like theft, absenteeism and violence (Ones et al, 1993; Snyman, Aamodt, Johnson & Frantzve, 1991), as well as for personality assessment. Finally, it is suggested that considerable research is warranted in the field of graphology to achieve an effective understanding of an apparently powerful technique, to overcome the hostility highlighted by Edwards and Armitage (1991), to close the chasm between the abundant research in the field of psychology contrasted with the paucity of graphological research, and to realise the potential that it would seem to promise.

#### **6.4 CHAPTER SUMMARY**

In this chapter conclusions, limitations and recommendations were presented.

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FINAL SAMPLE

MALE						FEMALE					
English first language		Afrikaans first language		Indigenous first language		English first language		Afrikaans first language		Indigenous first language	
MS	AM	MS	AM	MS	AM	MS	AM	MS	AM	MS	AM
N=30	N=30	N=30	N=29	N=30	N=29	N=29	N=30	N=30	N=30	N=30	N=30

MS = Managerial / Supervisory  
AM = Administrative / Marketing

## DESCRIPTIVE STATISTICS

## Means

LANGUAGE			
Factor	English	Afrikaans	Indigenous
I	74,3	75,2	76,0
II	20,4	18,8	21,8
III	20,3	20,2	19,8
IV	50,9	52,6	54,3
V	21,0	18,6	18,5
VI	15,3	13,5	13,4
VII	26,6	27,5	25,2
VIII	6,1	5,4	5,3
N	119	119	119

LANGUAGE AND GENDER						
Factor	English		Afrikaans		Indigenous	
	Male	Female	Male	Female	Male	Female
I	77,9	70,8	73,3	77,2	73,4	78,5
II	21,1	19,6	20,5	17,2	22,2	21,4
III	19,05	21,7	18,5	22,0	20,7	18,9
IV	51,6	50,1	47,3	57,8	56,5	52,2
V	20,1	22,0	17,9	19,3	19,8	17,3
VI	16,1	14,6	13,0	14,0	13,6	13,1
VII	26,0	27,3	26,2	28,8	24,1	26,2
VIII	8,2	4,1	7,1	3,7	6,5	5,3
N	60	60	59	59	59	60

LANGUAGE, GENDER AND POSITION												
Gender	M A L E						FEMALE					
Status	Managerial			Non-Managerial			Managerial			Non-Managerial		
Language	E	A	I	E	A	I	E	A	I	E	A	I
I	77,5	72,7	74,1	78,4	74,0	72,9	79,0	70,1	82,0	63,2	84,0	75,0
II	21,5	21,2	20,3	20,9	19,8	24,2	19,9	17,4	21,9	19,4	17,0	20,9
III	18,3	18,7	20,9	19,8	18,3	20,6	21,3	22,1	19,8	22,3	21,9	18,2
IV	53,7	49,7	53,2	49,7	44,9	59,9	51,3	60,1	47,7	49,1	55,5	56,7
V	20,5	17,4	21,0	19,8	18,5	18,7	22,0	18,5	18,4	22,0	20,2	16,2
VI	15,9	15,0	13,4	16,5	10,9	14,0	16,3	16,2	13,0	13,0	11,9	13,2
VII	25,8	28,6	24,5	26,2	23,6	23,8	27,5	30,0	27,5	27,2	27,7	25,0
VIII	8,9	7,2	6,9	7,5	7,0	6,2	4,7	3,9	5,7	3,6	3,6	5,1
N	30	30	30	30	29	29	29	30	30	30	30	30

Standard deviations

LANGUAGE			
Factor	English	Afrikaans	Indigenous
I	24,4	26,9	22,9
II	7,7	8,0	8,9
III	6,6	7,0	6,4
IV	15,8	16,8	17,1
V	6,5	7,5	7,8
VI	6,4	7,2	6,6
VII	7,5	8,6	6,9
VIII	5,3	4,4	5,1
N	119	119	119

LANGUAGE AND GENDER						
Factor	English		Afrikaans		Indigenous	
	Male	Female	Male	Female	Male	Female
I	23,9	24,6	24,6	29,1	25,0	20,6
II	6,7	8,6	8,5	7,2	8,7	9,2
III	6,6	6,5	7,8	5,7	7,1	5,6
IV	15,3	16,4	15,9	13,7	15,7	18,3
V	7,4	5,4	7,2	7,7	7,8	7,7
VI	6,3	6,4	6,7	7,7	6,4	6,9
VII	6,8	8,2	8,3	8,7	7,2	6,5
VIII	4,9	4,8	4,3	3,8	5,4	4,7
N	60	60	59	59	59	60

LANGUAGE, GENDER AND POSITION												
Gender	M A L E						FEMALE					
Status	Managerial			Non-Managerial			Managerial			Non-Managerial		
Language	E	A	I	E	A	I	E	A	I	E	A	I
I	24,0	30,07	26,12	24,36	17,49	24,37	22,18	31,76	23,47	24,66	24,92	16,88
II	6,36	8,26	7,54	7,12	9,03	9,60	8,71	8,25	9,68	8,80	6,14	8,97
III	6,95	8,23	8,83	6,36	7,61	5,08	5,93	4,44	6,41	7,04	6,83	4,78
IV	16,45	13,42	16,42	14,19	18,15	14,52	16,80	13,71	17,58	16,32	18,20	18,30
V	6,88	7,01	8,02	8,04	7,57	7,56	4,63	7,57	7,58	6,21	7,72	7,81
VI	6,55	6,08	6,89	6,24	6,96	6,00	6,99	8,13	6,60	5,44	6,81	7,32
VII	8,15	9,14	7,78	5,30	6,65	6,69	8,65	8,63	7,41	8,02	8,93	5,38
VIII	5,04	4,66	5,41	4,84	4,06	5,53	5,32	3,57	5,05	4,39	4,16	4,44
N	30	30	30	30	29	29	29	30	30	30	30	30

LANGUAGE, GENDER AND POSITION												
Gen-der	M A L E						FEMALE					
Status	Managerial			Non-Managerial			Managerial			Non-Managerial		
Lang-uage	E	A	I	E	A	I	E	A	I	E	A	I
I	24.0	30.1	26.1	24.4	17.5	24.4	22.2	31.8	23.5	24.7	24.9	16.9
II	6.4	8.3	7.5	7.1	9.0	9.6	8.7	8.3	9.7	8.8	6.1	9.0
III	7.0	8.2	8.8	6.4	7.6	5.1	5.9	4.4	6.4	7.0	6.8	4.8
IV	16.5	13.4	16.4	14.2	18.2	14.5	16.8	13.7	17.6	16.3	18.2	18.3
V	6.9	7.0	8.0	8.0	7.6	7.6	4.6	7.6	7.6	6.2	7.7	7.8
VI	6.6	6.1	6.9	6.2	7.0	6.0	7.0	8.1	6.6	5.4	6.8	7.3
VII	8.2	9.1	7.8	5.3	6.7	6.7	8.7	8.6	7.4	8.0	8.9	5.4
VIII	5.0	4.7	5.4	4.8	4.1	5.5	5.3	3.6	5.1	4.4	4.2	4.4
N	30	30	30	30	29	29	29	30	30	30	30	30

Age analysis

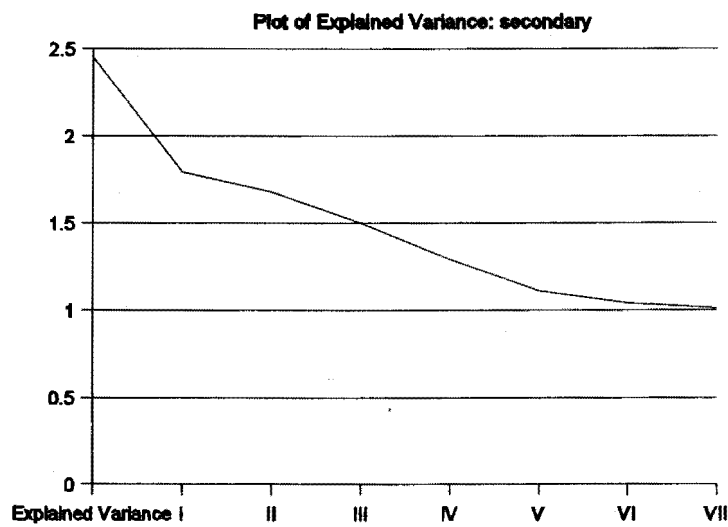
MANAGERS																		
Age	Male									Female								
	English			Afrikaans			Indigenous			English			Afrikaans			Indigenous		
	f	%	cP	f	%	cP	f	%	cP	f	%	cP	f	%	cP	f	%	cP
17-25							1	3	3	2	7	7				2	7	7
26-30	2	7	7	5	17	17	11	37	40	4	13	20	1	7	7	8	27	34
31-35	7	23	30	5	17	34	9	30	70	6	20	40	10	33	40	11	37	71
36-40	4	13	43	10	33	67	7	23	93	6	20	60	6	20	60	7	23	93
41-45	7	23	66	6	20	87	2	7	100	6	20	80	7	23	83	2	7	100
46-50	4	13	79	4	13	100				6	20	100	1	3	86			
51-55	5	17	96										4	14	100			
56-60	1	4	100															
N	30			30			30			30			29			30		

MARKETERS / ADMINISTRATORS																		
Age	Male									Female								
	English			Afrikaans			Indigenous			English			Afrikaans			Indigenous		
	f	%	cP	f	%	cP	f	%	cP	f	%	cP	f	%	cP	f	%	cP
17-25	6	20	20	7	24	24	2	7	7	7	23	23	11	37	37	3	10	10
26-30	11	37	57	8	28	52	10	34	41	6	20	43	3	10	47	13	43	53
31-35	6	20	77	5	17	69	13	46	86	4	13	56	3	10	57	6	20	73
36-40	4	13	90	5	17	86	4	14	100	8	26	82	4	13	70	6	20	93
41-45	3	10	100	2	7	93				3	10	92	5	17	87	2	7	100
46-50				2	7	100				1	4	96	2	7	94			
51-55										1	4	100	2	6	100			
56-60																		
N	30			29			29			30			30			30		

f = Frequency  
cp = Cumulative Percentage



SCREE DIAGRAM



## FACTOR ANALYSIS RESULTS

Primary Factor	Item	Description	Measures	Factor Weight	High Order Weight	Secondary Factor
A	10	spacing close	<ul style="list-style-type: none"> <li>- Coordination (Branston, 1990, p.50)</li> <li>- Clear communication of facts (Mendel, 1975, p.22)</li> <li>- Clear thinking (Singer, 1974, p.43)</li> <li>- Self confidence (Branston, 1990, p.50)</li> <li>- Confidence (Mendel, 1975, p.72)</li> <li>- Observance (Branston, 1990, p.50)</li> <li>- Extroversion (Mendel, 1975, p.72)</li> </ul>	0,41	0,72	I  E=2,45 Pv=12,3 CA= 0,611
	32	rhythmic	<ul style="list-style-type: none"> <li>- Reliability (Branston, 1990, p.44)</li> <li>- Decisiveness (Nezos, 1989, p.168)</li> <li>- Logic (Branston, 1990, p.71)</li> <li>- Objectivity (Nezos, 1989, p.168)</li> <li>- Determination (Nezos, 1989, p.106)</li> <li>- Optimism (Nezos, 1989, p.168)</li> <li>- Adaptability (Branston, 1990, p.103)</li> <li>- Confidence (Nezos, 1989, p.168)</li> <li>- Flexibility (Branston, 1990, p.153)</li> <li>- Independence (Nezos, 1989, p.168)</li> </ul>	0,62		
	37	structured	<ul style="list-style-type: none"> <li>- Maturity (Nezos, 1989, p.171)</li> <li>- Organisation (Nezos, 1989, p.166)</li> <li>- Action orientation (Nezos, 1989, p.171)</li> <li>- Creativity (Nezos, 1989, p.171)</li> </ul>	0,68		
	38	coordinated	<ul style="list-style-type: none"> <li>- Coordination ability (Singer, 1974, p.36)</li> </ul>	0,63		
	39	natural	<ul style="list-style-type: none"> <li>- Natural expressiveness (Myer, 1968, pp. 18-23)</li> <li>- Tolerance (Branston, 1990, p.76)</li> <li>- Capacity for endurance (Myer, 1968, p.25)</li> <li>- Organisational ability (Branston, 1990, p.76)</li> <li>- Reliability (Branston, 1990, p.135)</li> <li>- Methodical approach (Branston, 1990, p.76)</li> <li>- Orderliness (Branston, 1990, p.76)</li> </ul>	0,46		
B	31	regular	<ul style="list-style-type: none"> <li>- Leadership (Hill, 1981, p.138; Meyer, 1968, p.33; Singer, 1974, p.29)</li> <li>- Warmth (Branston, 1990, p.109)</li> <li>- Conscientiousness (Marley, 1967, p.74; Myer, 1968, p.148)</li> <li>- Organisational ability (Branston, 1990, p.135)</li> <li>- Orderliness (Myer, 1968, p.25; Nezos, 1989, p.121)</li> <li>- Methodical approach (Branston, 1990, p.135)</li> <li>- Self-discipline (Branston, 1990, p.135; Nezos, 1989, p.122; Singer, 1969, p. 91; Singer, 1974, p.40)</li> <li>- Responsibility (Nezos, 1989, p.138)</li> <li>- Tenacity (Marley, 1967, p.74; Myer, 1968, p.148)</li> <li>- Endurance (Branston, 1990, p.135; Myer, 1968, p.25)</li> <li>- Honesty (Nezos, 1989, p.152)</li> <li>- Determination (Myer, 1968, p.148)</li> <li>- Capacity for hard work (Branston, 1990, p.136)</li> <li>- Capacity to work steadily (Singer, 1969, p. 94)</li> <li>- Decisiveness (Myer, 1968, p.25)</li> <li>- Independence (Marley, 1967, p.40; Myer, 1968, p.33)</li> </ul>	0,48	0,77	

Primary Factor	Item	Description	Measures	Factor Weight	High Order Weight	Secondary Factor
B	31	regular contd	<ul style="list-style-type: none"> <li>- Energy (Greene &amp; Lewis, 1980, p.246; Myer, 1968, p.148)</li> <li>- Calmness (Myer, 1968, p.25)</li> </ul>	0,48	0,77	
	33	stable baseline	<ul style="list-style-type: none"> <li>- Dependability (Olyanova, 1970, p.283)</li> <li>- Frankness (Hill, 1981, p.135)</li> <li>- Truthfulness (Hill, 1981, p.143)</li> <li>- Commitment (Hill, 1981, p.135)</li> <li>- Independence (Hill, 1981, p.137; Mendel, 1975, p.160)</li> <li>- Loyalty (Hill, 1981, p.135)</li> </ul>	0,73		
	35	one letter stops short of baseline	<ul style="list-style-type: none"> <li>- Carefulness (Nezos, 1989, p.173)</li> </ul>	-0,79		
	36	legible	<ul style="list-style-type: none"> <li>- Extroversion (Branston, 1990, p.71)</li> <li>- Self assurance (Branston, 1990, p.194)</li> <li>- Speaking ability (Hill, 1981, p.142)</li> <li>- Cooperation (Mendel, 1975, p.146)</li> <li>- Organisation (Nezos, 1989, p.166)</li> <li>- Mentally agile (Branston, 1990, p.71)</li> <li>- Attention to detail (Marley, 1967, p.108)</li> <li>- Flexibility (Branston, 1990, p.71)</li> <li>- Trustworthiness (Hill, 1981 p.143)</li> <li>- Reliability (Branston, 1990, p.44)</li> <li>- Honesty (Hill, 1981, p.136)</li> <li>- Industriousness (Branston, 1990, p. 194)</li> <li>- Purposefulness (Branston, 1990, p.89; Marley, 1967, p.108; Mendel, 1975, p.146)</li> <li>- Intelligence (Amend &amp; Ruiz, 1980, p. 92)</li> <li>- Logic (Branston, 1990, p.71)</li> </ul>	0,37		
C	25	pressure horizontal	<ul style="list-style-type: none"> <li>- Logic (Branston, 1990, p.103)</li> </ul>	-0,89	0,69	
	26	pressure regular	<ul style="list-style-type: none"> <li>- Diligence (Mendel, 1975, p.125)</li> <li>- Reliability (Myer, 1968, p.148; Singer, 1969, p.94; Singer, 1974, p.41)</li> <li>- Intelligence (Mendel, 1975, p.125)</li> </ul>	0,86		
D	5	straight lines	<ul style="list-style-type: none"> <li>- Calmness (Nezos, 1989, p.180)</li> <li>- Orderliness (Branston, 1990, p.44; Mendel, 1975, p.80; Nezos, 1980, p.180)</li> <li>- Self discipline (Singer, 1974, p.31)</li> <li>- Responsibility (Branston, 1990, p.44)</li> <li>- Abstract thinking (Roman, 1952, p.83)</li> </ul>	0,78	0,48	
	12	margin - upper narrow	<ul style="list-style-type: none"> <li>- Respectfulness (Mendel, 1975, p.62)</li> <li>- Informality in attitude (Branston, 1990, p.36)</li> <li>- Directness (Mendel, 1975, p.62)</li> </ul>	0,67		
	34	straight baseline	<ul style="list-style-type: none"> <li>- Responsibility (Nezos, 1989, p.182)</li> <li>- Self control (Branston, 1990, p.44; Nezos, 1989, p. 180)</li> <li>- Consistency (Nezos, 1989, p.182)</li> <li>- Orderliness (Branston, 1990, p.80; Nezos, 1989, p.180)</li> <li>- Tenacity (Nezos, 1989, p.182)</li> </ul>	0,72		

Primary Factor	Item	Description	Measures	Factor Weight	High Order Weight	Secondary Factor
E	57	I dot low right of stem	<ul style="list-style-type: none"><li>- Planning (Marley, 1967, p.137)</li><li>- Coordination (Marley, 1967, p.136)</li><li>- Action orientation (Marley, 1967, p.137)</li><li>- Independence (Marley, 1967, p.136)</li></ul>	-0,77	0,61	II  E=1,79 Pv=9,0 CA=0,308
	58	I dot low directly above stem	<ul style="list-style-type: none"><li>- Planning (Marley, 1967, p.136)</li><li>- Conscientiousness (Hill, 1981, p.134; Myer, 1968, p.36)</li><li>- Attention to detail (Marley, 1967, p.134)</li><li>- Concentration (Hill, 1981, p.133)</li><li>- Practicality (Marley, 1967, p.137)</li></ul>	0,81		
	60	I dot exactly on stem	<ul style="list-style-type: none"><li>- Attention to detail (Olyanova, 1970, p.286)</li><li>- Positive attitude (Marley, 1967, p.137)</li><li>- Conscientiousness (Hill, 1981, p.134)</li><li>- Planning (Marley, 1967, p.138)</li></ul>	0,86		
F	27	normal pressure t-bar	<ul style="list-style-type: none"><li>- Reliability (Branston, 1990, p.159)</li></ul>	0,82	0,65	
	28	t-bar crosses midpoint	<ul style="list-style-type: none"><li>- Conscientiousness (Marley, 1967, p.140)</li><li>- Attention to detail (Marley, 1967, p.140)</li></ul>	0,55		
	30	strong balanced t-bar	<ul style="list-style-type: none"><li>- Conscientiousness (Olyanova, 1970, p.283)</li><li>- Dependability (Olyanova, 1970, p.283)</li></ul>	-0,72		
G	15	upper lean	<ul style="list-style-type: none"><li>- Ethical (Myer, 1968, p.169)</li><li>- Rational thinking (Myer, 1968, p.169)</li></ul>	0,43	0,74	
	43	word size increases	<ul style="list-style-type: none"><li>- Frankness (Singer, 1969, p. 29; Singer, 1974, p.30)</li><li>- Sincerity (Hill, 1981, p.142; Singer, 1969, p.90)</li><li>- Impulsivity (Olyanova, 1970, p.314)</li></ul>	-0,27		
	53	o closed	<ul style="list-style-type: none"><li>- Judgement (Hill, 1981, p.138)</li><li>- Dependability (Olyanova, 1970, p. 283)</li><li>- Honesty (Hill, 1981, p.138)</li></ul>	0,69		
H	6	spacing in letters narrow	<ul style="list-style-type: none"><li>- Concentration (Nezos, 1989, p.115)</li><li>- Practicality (Branston, 1990, p.101)</li><li>- Applies reason (Marley, 1967, p.84; Mendel, 1975, p.160; Myer, 1968, p.58)</li></ul>	0,37	-0,77	III  E=1,68 Pv=8,4 CA=0,149
	13	small	<ul style="list-style-type: none"><li>- Tolerance (Marley, 1967, p.43; Myer, 1968, p.32)</li><li>- Conscientiousness (Marley, 1967, p.114)</li><li>- Accuracy ((Branston, 1990, p.19; Marley, 1967, p.43; Singer, 1974, p. 30)</li><li>- Attention to detail (Marley, 1967, p.143)</li><li>- Self discipline (Singer, 1974, p.31)</li><li>- Adaptability (Marley, 1967, p.43)</li><li>- Concentration (Amend &amp; Ruiz, 1980, p.50; Hill, 1981, p.133; Marley, 1967, p.43; Mendel, 1975, p.140; Myer, 1968, p.63)</li><li>- Objectivity (Hill, 1981, p.138)</li><li>- Theoretical orientation (Marley, 1967, p.43)</li><li>- Individuality (Marley, 1967, p.43)</li><li>- Judgement (Hill, 1981, p.138)</li></ul>	0,78		
	16	middle small	<ul style="list-style-type: none"><li>- Emotional control (Mendel, 1975, p.161)</li><li>- Ambition (Branston, 1990, p.23)</li><li>- Objectivity (Mendel, 1975, p.161)</li></ul>	0,79		

Primary Factor	Item	Description	Measures	Factor Weight	High Order Weight	Secondary Factor
I	17	middle large	<ul style="list-style-type: none"> <li>- Self assurance (Myer, 1968, p.50)</li> <li>- Sociability (Myer, 1968, p.50)</li> <li>- Richness of inner values (Myer, 1968, p.50)</li> </ul>	0,73	0,75	
	19	middle full wide	<ul style="list-style-type: none"> <li>- Warmth (Branston, 1990, p.25)</li> <li>- Logic (Singer, 1969, p.88)</li> <li>- Self-confidence (Branston, 1990, p.25)</li> <li>- Individuality (Branston, 1990, p.95)</li> <li>- Sensitivity (Branston, 1990, p.25)</li> </ul>	0,62		
	42	left-tending movements	<ul style="list-style-type: none"> <li>- Independence (Myer, 1968, p.120)</li> <li>- Self-reliance (Myer, 1968, p.120)</li> </ul>	0,35		
	44	full letters	<ul style="list-style-type: none"> <li>- Empathy (Olyanova, 1970, p.315)</li> </ul>	0,69		
J	1	right slant	<ul style="list-style-type: none"> <li>- Attentiveness (Mendel, 1975, p.106)</li> <li>- Extroversion (Greene &amp; Lewis, 1980, p.247; Nezos, 1989, p.186; Olyanova, 1970, pp.20-21; Singer, 1969, p.91)</li> <li>- Desire to communicate (Marley, 1967, 46)</li> <li>- Ease of contact (Nezos, 1989, p. 186)</li> <li>- Friendliness (Hill, 1981, p.135)</li> <li>- Agreeableness (Mendel, 1975, p.106)</li> <li>- Warmth (Hill, 1981, p.144)</li> <li>- Frankness (Branston, 1990, p.98)</li> <li>- Receptivity (Mendel, 1975, p.106)</li> <li>- Sociability (Branston, 1990, pp.21-28; Myer, 1968, p.60; Olyanova, 1970, p.21)</li> <li>- Social ease (Marley, 1967, p. 45)</li> <li>- Spontaneity (Branston, 1990, p.98; Marley, 1967, p.45; Mendel, 1975, p.106)</li> <li>- Empathy (Marley, 1967, p.46)</li> <li>- Cooperation (Hill, 1981, p.134)</li> <li>- Honesty (Hill, 1981, p.136)</li> <li>- Action orientation (Mendel, 1975, p.101)</li> <li>- Activity (Branston, 1990, p.108; Marley, 1967, p.45; Myer, 1968, p.60)</li> <li>- Drive (Branston, 1990, p.98)</li> <li>- Energy, in females (Mendel, 1975, p.106)</li> <li>- Adaptability (Branston, 1990, p.67, Marley, 1967, p.43; Mendel, 1975, p.106; Myer, 1968, p.60; Nezos, 1989, p. 186; Roman, 1952, p.219)</li> <li>- Sincerity, in females (Mendel, 1975, p.106)</li> <li>- Compliance (Roman, 1952, p.187)</li> <li>- Optimism in males (Mendel, 1975, p.106)</li> <li>- Impulsivity (Olyanova, 1970, p.21)</li> <li>- Industriousness in males (Mendel, 1975, p.106)</li> <li>- Devotion (Myer, 1968, p.64)</li> <li>- Independence in males (Mendel, 1975, p.106)</li> <li>- Achievement orientation (Singer, 1974, p.33)</li> <li>- Ambition (Mendel, 1975, p.106)</li> <li>- Commitment (Myer, 1968, p.64)</li> <li>- Receptivity (Mendel, 1975, p.106)</li> </ul>	0,41	0,75	IV  E=1.50 Pv=7.5 CA= 0.054

Primary Factor	Item	Description	Measures	Factor Weight	High Order Weight	Secondary Factor
	3	connected	<ul style="list-style-type: none"> <li>- Social orientation (Branston, 1990, p. 72; Marley, 1967, p.102)</li> <li>- Planning (Marley, 1967, p.102; Myer, 1968, p.33)</li> <li>- Cooperation (Marley, 1967, p.102; Myer, 1968, p.81)</li> <li>- Adaptability (Branston, 1990, p.72; Myer, 1968, p.81; Nezos, 1989, p.151; Singer, 1974, p.34)</li> <li>- Persistence (Marley, 1967, p.102)</li> <li>- Perseverance (Nezos, 1989, p.151)</li> <li>- Calculation and strategy (Marley, 1967, p.102)</li> <li>- Action orientation (Nezos, 1989, p.151)</li> <li>- Concern with future goals (Amend &amp; Ruiz, 1980, p.106)</li> <li>- Goal-mindedness (Marley, 1967, p.102)</li> <li>- Purposefulness (Branston, 1990, p.72; Marley, 1967, p.102)</li> <li>- Concentration (Singer, 1974, p.34)</li> <li>- Consequential thinking (Myer, 1968, p.81)</li> <li>- Systematic thinking (Marley, 1967, p.102)</li> <li>- Deductive reasoning (Marley, 1967, p.102; Nezos, 1989, p.151)</li> <li>- Application of reason (Marley, 1967, p.102)</li> <li>- Logic (Branston, 1990, p.71; Mendel, 1975, p.193; Myer, 1968, p.68; Singer, 1969, p. 90; Singer, 1974, p.34)</li> <li>- Productive intelligence (Myer, 1968, p.81; Nezos, 1989, p.149)</li> <li>- Memory (Amend &amp; Ruiz, 1980, p.106; Nezos, 1989, p.151; Singer, 1969, p.93; Singer, 1974, p.34)</li> <li>- Abstract thinking (Marley, 1967, p.102)</li> </ul>	0,76		
	4	disconnected	<ul style="list-style-type: none"> <li>- Receptivity (Nezos, 1989, p.152)</li> <li>- Maturity (Marley, 1967, p.109)</li> <li>- Understanding of others (Marley, 1967, p.109)</li> <li>- Cooperation (Hill, 1981, p.134)</li> <li>- Attention to detail (Singer, 1974, p.34)</li> <li>- Self reliance (Branston, 1990, p.74, Marley, 1967, p.103; Mendel, 1967, p.103; Myer, 1968, p.84)</li> <li>- Individuality (Amend &amp; Ruiz, 1980, p.109; Branston, 1990, p.74; Marley, 1967, p.109; Myer, 1968, p.84)</li> <li>- Adaptability (Marley, 1967, p.103)</li> <li>- Creativity (Amend &amp; Ruiz, 1980, p.109)</li> <li>- Observance (Branston, 1990, p.74; Hill, 1981, p.139; Singer, 1969, p.90)</li> <li>- Sensitivity (Amend &amp; Ruiz, 1980, p.108)</li> <li>- Planning (Marley, 1967, p.103)</li> <li>- Imagination (Branston, 1990, p.74; Marley, 1967, p.103; Singer, 1974, p.34)</li> <li>- Logic (Nezos, 1989, p.151; Marley, 1967, p.10; Singer, 1969, p.88)</li> <li>- Flexibility (Marley, 1967, p.109)</li> </ul>	-0,59		
	45	concealing strokes first letter	<ul style="list-style-type: none"> <li>- Ambition (Mendel, 1975, p.209)</li> <li>- Shrewdness (Mendel, 1975, p.209)</li> </ul>	0,64		
	56	i decent size	<ul style="list-style-type: none"> <li>- Self esteem (Branston, 1990, p.21)</li> <li>- Confidence (Branston, 1990, p.21)</li> </ul>	0,46		

Primary Factor	Item	Description	Measures	Factor Weight	High Order Weight	Secondary Factor	
K	48	careful punctuation	- Thoroughness (Olyanova, 1970, p.287)	0,77	-0,39		
	49	exact commas	- Attention to detail (Singer, 1969, p.94) - Accuracy (Singer, 1969, p.94)	0,77			
L	14	relative	- Use of concepts (Myer, 1968, p.52) - Abstract thinking (Myer, 1968, p.52)	0,71	0,57		
	18	middle major	- Determination (Marley, 1967, p.36) - Self - assurance (Branston, 1990, p.23) - Sociability (Hill, 1981, p.142) - Firmness (Marley, 1967, p.36) - Balance in outlook (Marley, 1967, p.36)	-0,74			
	20	lower long extensions	- Sociability (Greene & Lewis, 1980, p.250) - Observance (Mendel, 1975, p.139) - Extroversion (Greene & Lewis, 1980, p.250) - Organisational inclination (Marley, 1967, p.36) - Practicality (Branston, 1990, p.23; Marley, 1967, p.102; Myer, 1968, p.54) - Attention to detail (Mendel, 1975, p.139)	0,75			
M	8	line spacing narrow	- Creativity (Branston, 1990, p.41) - Action orientation (Branston, 1990, p.41)	-0,64	0,77		V  E=1.29 Pv=6.4 CA= 0.141
	9	line spacing medium	- Organisation in daily routine (Roman, 1952, p.293) - Consequential thinking (Meyer, 1968, p. 81)	0,83			
	11	general spacing medium	- Communicativeness (Branston, 1990, p.30) - Reliability (Branston, 1990, p.108) - Coordination (Singer, 1969, pp.90-93) - Perceptive intelligence (Roman, 1952, p.50) - Intelligence (Branston, 1990, p.203; Hill, 1981, p.137; Singer, 1969, p.89) - Judgement (Olyanova, 1970, p.73) - Orderliness (Amend & Ruiz, 1980, p.52; Branston, 1990, p. 30; Roman, 1952, p.293) - Convictions (Mendel, 1975, p.126)	0,82			
N	40	simplified	- Spontaneity (Hill,1981, p.142; Mendel, 1975, p.200) - Maturity (Marley, 1967, p.166; Myer, 1968, p.175) - Orderliness (Marley, 1967, p.166; Mendel, 1975, p.177) - Honesty (Hill,1981, p.142) - Adaptability (Nezos, 1989,p.124) - Creativity (Marley, 1967, p.166) - Concentration (Hill, 1981, p.133; Marley, 1967, p.166; Singer, 1969, p.94) - Intelligence (Greene & Lewis, 1989, p.244; Hill, 1981, p.137; Singer, 1969, p.89; Singer, 1974, p.41). - Logic (Branston, 1990, p.71) - Adaptability (Nezos, 1989, p.124) - Objectivity (Branston, 1990, p.89; Marley, 1967, p.166; Singer, 1974, p.41) - Practicality (Marley, 1967, p.166) - Judgement (Marley, 1967, p.166; Myer, 1968, p.175) - Mental agility (Branston, 1990, pp. 88-89)	0,71	0,56		

Primary Factor	Item	Description	Measures	Factor Weight	High Order Weight	Secondary Factor
	41	direct, no roundabouts	- Goal orientation (Singer, 1974, p.33) - Purposefulness (Singer, 1974, p.33) - Concentration (Singer, 1974, p.33)	0,73		
O	21	lower straight	- Independence (Amend & Ruiz, 1980, p.21) - Concentration (Hill, 1981, p.133; Singer, 1969, p.94) - Judgment (Olyanova, 1970, p.302) - Efficiency (Amend & Ruiz, 1980, p.87)	0,66		VI  E=1,11 Pv=5,6 CA=-0,186
	22	lower pulled forward	- Extroversion (Hartford, 1986, p.177)	-0,76		
P	7	between letters narrow	- Practicality (Branston, 1990, p.101) - Dependability (Branston, 1990, p.101) - Application of reason (Marley, 1967, p.84; Mendel, 1975, p.160; Myer, 1968, p.58) - Tact (Branston, 1990, p.101; Marley, 1967, p.84; Myer, 1968, p.58) - Self control (Singer, 1974, p.34) - Self-discipline (Singer, 1974, p.34)	-0,49	0,55	
	59	I dot high right	- Impulsivity (Amend & Ruiz, 1980, p.122) - Action orientation (Marley, 1967, p.137) - Factual memory (Olyanova, 1970, p.286)	0,71		
Q	23	secondary pressure	- Optimism (Mendel, 1975, p.126) - Sensitivity (Myer, 1968, p.155) - Adaptability (Mendel, 1975, p.126) - Expedience (Mendel, 1975, p.126) - Convictions (Mendel, 1975, p.126) - Maturity (Mendel, 1975, p.126) - Creativity (Mendel, 1975, p.126) - Consistency (Mendel, 1975, p.126)	0,83	0,57	VII  E=1,04 Pv=5,2 CA=-,0111
	24	light pressure	- Sensitivity (Branston, 1990, p.25; Hill, 1981, p.141; Marley, 1967, p.77) - Receptivity (Marley, 1967, p.77) - Attention to detail (Branston, 1990, p.109) - Tolerance (Marley, 1967, p.77) - Flexibility (Marley, 1967, p.77) - Expedience (Marley, 1967, p.77)	-0,87		
R	50	a open	- Confidence (Nezos, 1989, p.117)	0,93	-0,71	
	51	a open top or right	- Confidence (Nezos, 1989, p.117) - Dependability (Olyanova, 1970, p.283)	0,92		
	52	a closed	- Sincerity (Hill, 1981, p.136) - Honesty (Hill, 1981, p.136) - Truthfulness (Hill, 1981, p.136)	-0,79		
	55	ovals normal small closed	- Honesty (Amend & Ruiz, 1980, p.84) - Determination (Amend & Ruiz, 1980, p.84)	-0,54		
S	15	Upper lean	- Ethics (Myer, 1968, p.169) - Rational thinking (Myer, 1968, p.169)	0,84	N/A	VIII




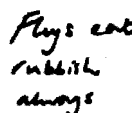
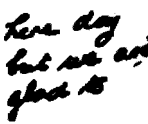
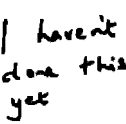
Primary Factor	Item	Description	Measures	Factor Weight	High Order Weight	Secondary Factor
	2	Mix connected and disconnected	<ul style="list-style-type: none"><li>- Adaptability (Branston, 1990, p.74)</li><li>- Creativity (Branston, 1990, p.74)</li><li>- Resourceful (Branston, 1990, p.74)</li></ul>	0,92		E=1,01 Pv=5,1 CA=0,302
	29	t - bar joins following letter	<ul style="list-style-type: none"><li>- Fluency (Hill, 1981, p.144)</li><li>- Mental agility (Branston, 1990, p.71)</li><li>- Intelligence (Hill, 1981, p.137; Singer, 1969, p.89)</li></ul>	0,38		
	54	y formed like a 7	<ul style="list-style-type: none"><li>- Judgement (Hill, 1981, p.138)</li></ul>	0,42		
Total explained variance: 59,4%						

E = Eigenvalue of factor

Pv = Variance explained by factor


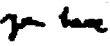
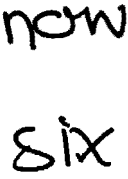
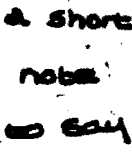
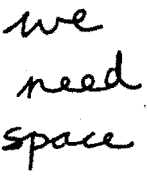
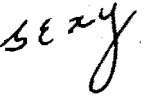
CA= Cronbach Alpha Coefficient

7GFS SCORING KEY FOR HANDWRITING CHARACTERISTICS

Handwriting					Raw factor scores															
No	Category	Charac- teristic	Description	Illustration	1 +	1 -	2 +	2 -	3 +	4 +	4 -	5 +	5 -	6 +	6 -	7 +	7 -	8 +		
1	Slant	Right	Angles of inclination between 55 and 85 degrees as measured by a protractor (Mendel, 1975, p.105)							4										
SELECT 2, 3 OR 4 OR NONE FOR PRINTSCRIPT																				
2	Connections	Mix connected and dis-connected	No dominant pattern of connectedness and disconnectedness (Branston, 1990, p.74)															9		
3		Connected	Connecting strokes which link the letters together (Amend & Ruiz, 1980, p.102). In any sentence at least five letters are connected together into one continuous movement (Marley, 1967, p.96)							8										
4		Dis-connected	Most letters unconnected (Mendel, 1975, p.75)								6									
SUB-TOTALS																				


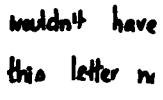
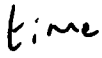
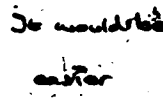
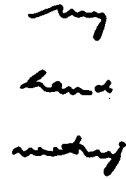
Handwriting					Raw factor scores															
No	Category	Charac- teristic	Description	Illustration	1 +	1 -	2 +	2 -	3 +	4 +	4 -	5 +	5 -	6 +	6 -	7 +	7 -	8 +		
REFER ALSO 34 - STRAIGHT BASELINE																				
5	Line direction	Straight lines	Words drafted along the horizontal plane as assessed with a ruler at the bottom of the middle zone (Amend & Ruiz, 1980, p.17; Myer, 1968, p.94)	<i>good drafts</i>	8															
6	Spacing	Within letters narrow	Width is less than the height of the downstrokes (Marley, 19967, p. 82) - The letter 'n' should be square. In narrow writing it is compressed (Amend & Ruiz, 1980, p. 51)	<i>Manner from</i>					4											
7		Between letters narrow	Letters are close together, crowded and in contact with each other (Amend & Ruiz, 1980, p.51)	<i>passionate</i>											5					
SELECT 8 OR 9 OR NEITHER																				
8		Line spacing narrow	Crowded and tangled lines (Amend & Ruiz, 1980, p.53)	<i>things confuse me</i>									6							
9		Line spacing medium	Loops do not mingle with or touch the lines above or beneath (Branston, 1990, p.39)	<i>wouldn't have this letter</i>									8							
SUB-TOTALS																				

Handwriting					Raw factor scores															
No	Category	Characteristic	Description	Illustration	1+	1-	2+	2-	3+	4+	4-	5+	5-	6+	6-	7+	7-	8+		
SELECT 10 OR 11 OR NEITHER																				
10		General spacing close, even	Good spacing and well balanced (Branston, 1990, p.50). Lines are close, but not touching and evenly balanced (Amend & Ruiz, 1980, p.52)		4															
11		General spacing medium, well	Even distribution of spaces between lines and words (Olyanova, 1970, p.51). Words and lines do not mingle (Amend & Ruiz, 1980, p.52)									8								
12	Margins	Upper narrow	Margin less than 10mm from the top (Branston, 1990, p.36)		7															
13	Size	Small	Middle zone smaller than 3mm - as measured with a ruler. Note vowels a, e, i, o, u (Marley, 1967, p.39)						8											
14		Relative size	Upper and lower zones oversized in relation to middle zone (Myer, 1968, p.46). An under-developed middle zone between prominent upper and lower zones (Mendel, 1975, p.136)								7									
SUB-TOTALS																				

Handwriting					Raw factor scores															
No	Category	Characteristic	Description	Illustration	1 +	1 -	2 +	2 -	3 +	4 +	4 -	5 +	5 -	6 +	6 -	7 +	7 -	8 +		
15	Zones	Upper lean	Upper zone loops occupy a smaller space than that prescribed in the school model. The appearance of the loops are virtually retraced and pointed (Myer, 1968, p.163)				4											8		
SELECT 16 OR 17 OR NEITHER, IF LARGE																				
16		Middle small	Middle zone letters measure less than 3mm with a ruler (Branston, 1990, p.21)						8											
17		Middle large	Middle zone letters measure more than 3mm with a ruler (Branston, 1990, p.21)						7											
18		Middle major	The middle zone is large in relation to the upper and lower zones (Branston, 1990, p.21)								7									
19		Middle full/wide	Full, curved, wider and more rounded than prescribed in the copybook model (Branston, 1990, p.93)						6											
20		Lower long extensions	Lower extensions longer than 5mm, as measured by a ruler (Branston, 1990, p.29)								8									
SUB-TOTALS																				

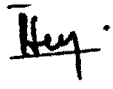
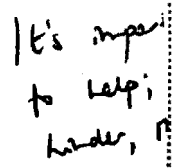
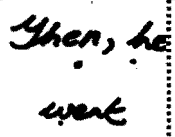





Handwriting					Raw factor scores															
No	Category	Characteristic	Description	Illustration	1 +	1 -	2 +	2 -	3 +	4 +	4 -	5 +	5 -	6 +	6 -	7 +	7 -	8 +		
21		Lower straight, no loops, sticklike figures	Lower zone loops lean (Myer, 1968, p.169) or straight lines without loops (Olyanova, 1970, p.302)	<i>analyze</i>											7					
22		Pulled forward	Downstrokes pulled forward in relation to the direction of the script (Hartford, 1986, p.177)	<i>fly</i>												8				
23	Pressure	None/sec-ondary	Feel the reverse of the paper - no evidence of pressure applied by the pen used - usually thin strokes (Mendel, 1975, p.126; Myer, 1968, p.152)	<i>I don't like to impose</i>													8			
24		Light	Feel the reverse of the paper - nominal application of pressure (Marley, 1967, p.84)	<i>I feel fine</i>														9		
25		Horizontal	Lively rhythm, simplified letter forms and evenly distributed pressure throughout the script (Branston, 1989, p.103)	<i>that</i>		9														
SUB-TOTALS																				







Handwriting					Raw factor scores															
No	Category	Charac- teristic	Description	Illustration	1 +	1 -	2 +	2 -	3 +	4 +	4 -	5 +	5 -	6 +	6 -	7 +	7 -	8 +		
26		Regular	Consistent pressure pattern maintained throughout the script (Branston, 1989, p.103)	<i>sits still</i>	9															
27	t-bars	Normal pressure on t bar	Pressure medium and same on bar as stem (Branston, 1989, p.159)	<i>t</i>			8													
28		Crosses stem at midpoint	Bar crosses the stem at the midpoint (Marley, 1967, p.40)	<i>t</i>			6													
29		t-bar joins following letter	Bar makes a connection with the letter directly following it - or with a later letter (Hill, 1981, p.144)	<i>this</i>														4		
30		Strong/balanced	Heavy pressure applied and in balance in relation to the stem (Hartford, 1989, p.168)	<i>t</i>				7												
31	Regularity	Regular	Evenness in the height of the downstrokes in the middle zone. The same distance between downstrokes is maintained. The slant is consistent (Myer, 1968, p.25)	<i>We would very much</i>	5															
32		Rhythmic	Small irregularities in the script constantly repeated (Nezos, 1989, p.168)	<i>Story Surprisingly</i>	6															
SUB-TOTALS																				

Handwriting					Raw factor scores															
No	Category	Characteristic	Description	Illustration	1 +	1 -	2 +	2 -	3 +	4 +	4 -	5 +	5 -	6 +	6 -	7 +	7 -	8 +		
SELECT 33, 34, 35 OR NONE FOR ERRATIC BASELINE																				
33	Baseline	Stable	Words and letters proceed along straight base - regardless of whether they are horizontal, rising or falling (Nezos, 1989, p.168)		7															
REFER ALSO 5 STRAIGHT BASELINE																				
34		Straight	The lines run parallel to the top and bottom edge of the paper (Nezos, 1989, p.168)		7															
35		One letter stops short of baseline	The odd letter is suspended at the beginning, middle or end of words (Nezos, 1989, p.168)		8															
36	Legibility	Legible	Easily readable. If the beginning and end of letters are covered by the reader it is still possible to easily decipher letters without a context (Amend & Ruiz, 1980, p.92)		4															
37	Style	Structured	The architectural formation the letters is well constructed, balanced and fluid (Nezos, 1989, p.171)		7															
SUB-TOTALS																				



Handwriting					Raw factor scores															
No	Category	Charac- teristic	Description	Illustration	1 +	1 -	2 +	2 -	3 +	4 +	4 -	5 +	5 -	6 +	6 -	7 +	7 -	8 +		
38		Coord- inated	The whole and the parts of the script are in harmony (Singer, 1974, p.36)	<i>My garden is well designed and organized</i>	6															
39		Natural	No ornamentation - simple letter formations and legible (Myer, 1968, p.69)	<i>with us</i>	5															
40		Simplified	No ornamentation, original style and well spaced (Hill, 1981, p.97)	<i>and blue is real?</i>								7								
41		Direct; no round- abouts	Up and down strokes are directed without unnecessary roundabout movements (Singer, 1974 p.33)	<i>the results are</i>								7								
42		Left tending move- ments	Movements towards the left which are contrary to the progressive movement of the script (Myer, 1968, p.120)	<i>many people</i>					4											
43		Word size increas- ing	Words expand in relation to the start (Hill,1981, p.142)	<i>tailless</i>				3												
44		Full letters	Letters are more curved or rounded than the copybook model prescribes (Branston, 1989, p.93)	<i>When</i>						7										
SUB-TOTALS																				

Handwriting					Raw factor scores															
No	Category	Charac- teristic	Description	Illustration	1 +	1 -	2 +	2 -	3 +	4 +	4 -	5 +	5 -	6 +	6 -	7 +	7 -	8 +		
45	Punctuation	Conceal- ing strokes in first letter	The original pen stroke is concealed by another. Note particularly the letters u, i, e, d (Mendel, 1975, p.201)							6										
48		Careful punct- uation	Careful inclusion of full stops, commas, hyphens and parenthesis (Olyanova, 1970, p.287)							8										
49		Exact com- ma's	Placement of commas exact (Singer, 1969, p.94)							8										
50 AND 51 COULD BOTH APPLY - 50/51 OR 52																				
50	small letters	a open	Small a open at any point of the formation (Hartford, 1989, p.177)													9				
51		a open to the top or to the right	Small a open to the right or to the top (Hartford, 1989, p.177)														9			
52		a closed	Small a closed (Hill, 1981, p.137)															8		
53		o closed	Small o closed (Hill, 1981, p.138)				7													
54		y like 7	The formation of the y gives the appearance of a 7 (Hill, 1981, p.138)																4	
SUB-TOTALS																				

Handwriting					Raw factor scores															
No	Category	Charac- teristic	Description	Illustration	1 +	1 -	2 +	2 -	3 +	4 +	4 -	5 +	5 -	6 +	6 -	7 +	7 -	8 +		
55		ovals normal small lightly closed	One small loop to the right and closed in the middle zone (Amend & Ruiz, 1980, p.84)															5		
56		i decent size	The letter i the same size as the letters in the rest of the script (Branston, 1989, p.21)							5										
57		i dot low right of stem	i dot almost touches the stem and tends to the right of the stem (Marley, 1967, p.136).					8												
58		i dot low directly above stem	i dot almost touches the stem and is directly above it (Hill, 1981, p. 133).				8													
59		i dot high right of stem	i dot is high above the stem and placed to the right of the stem (Marley, 1967, p.136)											7						
60		i dot exactly above stem	i dot is directly above the stem - as measured by a ruler (Marley, 1967, p.137)				9													
ADD						-		-			-		-		-		-			
DEDUCT - FROM + SCORES																				
ADD VALUE TO ACHIEVE A POSITIVE SCORE					34		12		0	20		6		13		22		0		
REFER TO NORM TABLE TO CONVERT TO STENS / BANDS																				

CRONBACH ALPHA COEFFICIENTS FOR THE NEW 7GFS

Factor	Cronbach alpha coefficient	Factor	Cronbach alpha coefficient
I	0,611	II	0,308
III	0,149	IV	0,054
V	0,141	VI	0,186
VII	0,111	VIII	0,302

## STEPWISE REGRESSION ANALYSIS

SCALE	Variable Ref	Description	Detail	F to include	Multiple R
I Task orientation-directive	SORT2 (-)	Low Practical	<ul style="list-style-type: none"> <li>- Thinks concretely (Louw,1975)</li> <li>- Lacks creativity (Billings et al, 1993)</li> <li>- Approaches problems from definite details (Louw,1975)</li> </ul>	9,22**	0,168
	PF4	Humble-Assertive, dominance	<ul style="list-style-type: none"> <li>- Aggressive (Cattell et al, 1970)</li> <li>- Concrete thinking (Billings et al, 1993)</li> <li>- Authoritarian (Cattell et al, 1970)</li> <li>- Unimaginative (Billings et al, 1993)</li> <li>- Competitive (Cattell et al, 1970)</li> <li>- Stubborn (Cattell et al, 1970)</li> <li>- Leadership (Lord et al, 1986)</li> <li>- Dominant (Melamed &amp; Bozionelis, 1992)</li> <li>- Enjoys controlling and criticising others (Karson &amp; O'Dell, 1974)</li> <li>- Enjoys being in command (Karson &amp; O'Dell, 1974)</li> <li>- Rises to challenges (Karson &amp; O'Dell, 1974)</li> <li>- Feels superior to others (Karson &amp; O'Dell, 1974)</li> <li>- Friendly (Orford, 1986)</li> </ul>	8,09**	0,221
II Task orientation - conscientious	TAT1	High Need for Achievement	<ul style="list-style-type: none"> <li>- A desire to accomplish something difficult (Murray, 1938)</li> <li>- A need to master, manipulate or organise physical objects, human beings or ideas, rapidly and independently (Murray, 1938)</li> <li>- A desire to improve and excel (McClelland, 1961; 1975)</li> <li>- A need to overcome obstacles (Murray, 1938)</li> <li>- A need to attain a high standard (McClelland, 1961; 1975; Murray, 1938)</li> <li>- A desire to compete (McClelland, 1961; 1975)</li> <li>- Driven to excel and to achieve standards (McClelland et al, 1961; McClelland &amp; Burnham, 1976)</li> <li>- Derives emotional satisfaction from goal mastery (Maddi, 1976).</li> <li>- Accepts personal responsibility for solving problems (Arnold et al, 1998; Atkinson, 1964; McClelland et al, 1953; McClelland, 1961; McClelland &amp; Burnham, 1976; Sagie et al, 1998; Spangler, 1992; Stahl, 1986)</li> <li>- A fear of failure (Atkinson &amp; Feather, 1966)</li> <li>- Seeks immediate feedback on performance (Arnold et al, 1998; Atkinson, 1964; McClelland et al, 1953; McClelland, 1961; McClelland &amp; Burnham, 1976; Sagie et al, 1998; Spangler, 1992; Stahl, 1986)</li> </ul>	13,49**	0,202

SCALE	Variable Ref	Description	Detail	F to include	Multiple R
II Task orientation - conscientious contd	TAT1 contd	High Need for Achievement contd	<ul style="list-style-type: none"> <li>- Responds to moderate goals (Arnold et al, 1998; Atkinson, 1964; McClelland et al, 1953; McClelland, 1961; McClelland &amp; Burnham, 1976; Sagie et al, 1998; Spangler, 1992; Stahl, 1986)</li> <li>- Succeeds as an entrepreneur, executive (Pervin, 1996) or as a manager of a self-contained unit within a large organisation (McClelland et al, 1974)</li> <li>- Achieves technical, economic (Varga, 1975) or career success (Spangler, 1992).</li> <li>- Contributes to society (Parker &amp; Chusmir, 1991)</li> <li>- Independent (Rokeach, 1973)</li> <li>- Intellectual values (Rokeach, 1973)</li> <li>- Achieves status / wealth (Parker &amp; Chusmir, 1991)</li> </ul>		
	PF10 (-)	Practical-imaginative	<ul style="list-style-type: none"> <li>- Down to earth (Cattell et al, 1970)</li> </ul>	10,52**	0,249
	PF2	Less - More intelligent	<ul style="list-style-type: none"> <li>- Abstract thinking (Cattell et al, 1970)</li> <li>- Bright (Cattell et al, 1970)</li> <li>- Insight (Cattell et al, 1992)</li> <li>- Intellectually adaptable (Cattell et al, 1992)</li> <li>- Intellectual interests (Cattell et al, 1992)</li> <li>- Judgement (Cattell et al, 1992)</li> <li>- High morale (Cattell et al, 1992)</li> <li>- Persevering (Cattell et al, 1992)</li> <li>- Conscientious (Dunn et al, 1995)</li> </ul>	9,76**	0,292
	TAT3 (-)	Low Need for affiliation	<ul style="list-style-type: none"> <li>- Results orientated (Carson &amp; Gilliard, 1993)</li> <li>- Self - controlled (McClelland &amp; Boyatzis, 1984)</li> </ul>	9,05**	0,322
III Emotional stability	No significant correlations found, suggesting that this is a new construct				
IV Extroverted interpersonal orientation	TAT 4 (-)	Low Need for power	<ul style="list-style-type: none"> <li>- Preoccupied with family relationships (Parker &amp; Chusmir, 1991)</li> </ul>	5,43*	0,129
	TAT 5	High Dependence	<ul style="list-style-type: none"> <li>- Relies on others for emotional, economic or other forms of support (Reber, 1986)</li> </ul>	5,85**	0,189
	SORT25 (-)	Low Flexibility	<ul style="list-style-type: none"> <li>- Consistency (Louw, 1975)</li> </ul>	5,42**	0,222
V Independence	TAT 2 (-)	Internal Locus of control	<ul style="list-style-type: none"> <li>- Believes that hard work, skill, acceptance of responsibility and foresight lead to positive outcomes (Chance, 1965)</li> <li>- Believes that there is control over the work environment, that work procedures, working conditions, task assignments and relationships can be influenced and resists close supervision (Hawk, 1994)</li> </ul>	6,47*	0,141

SCALE	Variable Ref	Description	Detail	F to include	Multiple R
V Independence contd	TAT 2 (-) contd	Internal Locus of control contd	<ul style="list-style-type: none"> <li>- Effective in interpersonal relationships (Meyer &amp; Suttan, 1996)</li> <li>- Awareness that hard work, skill, acceptance of responsibility and foresight lead to positive outcomes (Chance, 1965)</li> <li>- Flexible in responding to situational demands (Cilliers &amp; Wissing, 1993)</li> <li>- Motivated (Spector, 1982)</li> <li>- Successful (Bar-Tal &amp; Bar-Zohar, 1977)</li> <li>- Convinced that effort leads to performance (Spector, 1982)</li> <li>- Quits dissatisfying jobs (Digman, 1990)</li> </ul>		
	SORT 25	High Flexibility	<ul style="list-style-type: none"> <li>- Adaptable (Louw, 1975)</li> <li>- Willing to experience new situations (Katzell, 1994)</li> <li>- Accepts situations (Louw, 1975)</li> <li>- Deals with situations maturely (Louw, 1975)</li> <li>- Adjusts to different situations ( Foster, 1989; Louw, 1975)</li> <li>- Successful in jobs (Muchinsky et al, 1998)</li> </ul>	5,64**	0,186
	PF 11	Forthright - shrewd	<ul style="list-style-type: none"> <li>- Astute (Cattell et al, 1970)</li> <li>- Wordly (Cattell et al, 1970)</li> <li>- Calculating (Cattell et al, 1992)</li> <li>- Socially aware (Cattell et al, 1992)</li> <li>- Insightful (Cattell et al, 1992)</li> <li>- Emotionally detached (Cattell et al, 1992)</li> <li>- Disciplined (Cattell et al, 1992)</li> <li>- Artful (Cattell et al, 1992)</li> <li>- Aesthetically fastidious (Cattell et al, 1992)</li> <li>- Ambitious (Cattell et al, 1992)</li> <li>- Insecure (Cattell et al, 1992)</li> <li>- Smart in cutting corners (Cattell et al, 1992)</li> </ul>	5,19**	0,217
	PF 6 (-)	Expedient-conscientious	<ul style="list-style-type: none"> <li>- Disregards rules (Cattell et al, 1970)</li> </ul>	5,22**	0,250
VI Conceptualisation	PF 12 (-)	Complacent-apprehensive	<ul style="list-style-type: none"> <li>- Self-assured (Cattell et al, 1970)</li> <li>- Placid (Cattell et al, 1970)</li> <li>- Secure (Cattell et al, 1970)</li> <li>- Resilient (Cattell et al, 1992)</li> <li>- Cheerful (Cattell et al, 1992)</li> <li>- Expedient (Cattell et al, 1992)</li> <li>- Insensitive to the approval or disapproval of others (Cattell et al, 1992)</li> <li>- Uncaring (Cattell et al, 1992)</li> <li>- Fearless (Cattell et al, 1992)</li> <li>- Takes simple action (Cattell et al, 1992)</li> </ul>	6,47**	0,141
	PF 6 (-)	Expedient - conscientious	<ul style="list-style-type: none"> <li>- Disregards rules (Cattell et al, 1970)</li> <li>- Feels few obligations (Cattell et al, 1970)</li> </ul>	6,52**	0,199
	SORT 16	High Social responsibility	<ul style="list-style-type: none"> <li>- Willing to be subservient, even if this is not for personal gain (Louw, 1975)</li> <li>- Accepts obligations (Louw, 1975)</li> </ul>	6,34**	0,239

SCALE	Variable Ref	Description	Detail	F to include	Multiple R
	SORT 5	High Deduction	<ul style="list-style-type: none"> <li>- Logical application of existing theories, principles (Louw, 1975)</li> <li>- Generalisation (Louw, 1975)</li> <li>- Analysis of relationships (Louw, 1975)</li> </ul>	6,68**	0,280
VII Openness to experience	PF 13	Conservative - experimenting	<ul style="list-style-type: none"> <li>- Liberal (Cattell et al, 1970)</li> <li>- Analytical (Cattell et al, 1970)</li> <li>- Free thinking (Cattell et al, 1970)</li> <li>- Well informed (Cattell et al, 1992)</li> <li>- Keen to experiment with new ideas (Cattell et al, 1992)</li> <li>- Avoids moralistic judgements (Cattell et al, 1992)</li> <li>- Aggressive (Karson &amp; O'Dell, 1974)</li> <li>- Radical (Karson &amp; O'Dell, 1974)</li> <li>- Tramples on others (Karson &amp; O'Dell, 1974)</li> </ul>	10,54**	0,179
	PF 12	Complacent-apprehensive	<ul style="list-style-type: none"> <li>- Self reproaching (Cattell et al, 1970)</li> <li>- Worrying (Cattell et al, 1970)</li> <li>- Troubled (Cattell et al, 1970)</li> <li>- Insecure (Cattell et al, 1970)</li> </ul>	8,10**	0,221
	TAT 4 (-)	Low Need for power	<ul style="list-style-type: none"> <li>- Preoccupied with family relationships (Parker &amp; Chusmir, 1991)</li> </ul>	6,84**	0,247
VIII Need for power	TAT 4	High Need for power	<ul style="list-style-type: none"> <li>- Desires control of the environment and influence over others (Steers, 1987)</li> <li>- Superior performance (McClelland, 1975; Steers &amp; Braunstein, 1976)</li> <li>- Leadership (McClelland, 1975; Steers &amp; Braunstein, 1976)</li> <li>- Makes others behave in a way that they would not otherwise have behaved (Atkinson, 1964; McClelland, 1961; 1975; Stahl, 1986)</li> <li>- Enjoys positions of status with authority (Atkinson, 1964; McClelland, 1961; 1975; Stahl, 1986)</li> <li>- Influences others to gain prestige (Atkinson, 1964; McClelland, 1961; 1975; Stahl, 1986)</li> <li>- Given to impulsive actions (Winter, 1988; Winter &amp; Stewart, 1978) like aggression (Winter, 1973) drinking and extreme risk-taking (Winter &amp; Stewart, 1978)</li> <li>- Calls attention to himself (Winter, 1973)</li> <li>- Seeks visibility (Winter, 1973)</li> <li>- Assertive (Meyer &amp; Sutton, 1996)</li> <li>- Establishes himself in an influential position within an organisation (Winter, 1973)</li> <li>- Develops networks of potential allies (Winter, 1973)</li> </ul>	8,89**	0,165



SCALE	Variable Ref	Description	Detail	F to include	Multiple R
VIII Need for power contd	TAT 4 contd	High Need for power contd	<ul style="list-style-type: none"> <li>- Directs people (Winter, 1973)</li> <li>- Sanctions the behaviour of others (Winter, 1973)</li> <li>- Talks a lot in small groups (Winter, 1978).</li> <li>- Influential in eliciting participation and defining actions (Winter, 1973)</li> <li>- Successful as an executive (Cummin, 1967)</li> <li>- Achieves technical and economic success (Varga, 1975)</li> <li>- Maintains visibility; establishes self in influential positions and develops networks of potential allies (Winter, 1973)</li> <li>- Assertive (Meyer &amp; Suttan, 1996)</li> <li>- Directs people (Winter, 1973)</li> <li>- Responsibly applied with ethics, accountability and concern for subordinates (Winter, 1981)</li> <li>- Vulnerability (Fodor &amp; Farrow, 1979)</li> <li>- Ingratiation (Fodor &amp; Farrow, 1979)</li> <li>- Groupthink (Fodor &amp; Farrow, 1979)</li> <li>- Defective in decision making (Fodor &amp; Farrow, 1979).</li> <li>- Creates a vision and impetus for action, where power is applied effectively (Peters &amp; Austin, 1985).</li> </ul>		
	PF 2	Less - More Intelligence	<ul style="list-style-type: none"> <li>- Abstract thinking (Cattell et al, 1970)</li> <li>- Bright (Cattell et al, 1970)</li> </ul>	8,04**	0,220
	PF 8 (-)	Tough minded - tender-minded	<ul style="list-style-type: none"> <li>- Rejects illusions (Cattell et al, 1970)</li> <li>- Expects little (Cattell et al, 1992)</li> <li>- Unsentimental (Cattell et al, 1992)</li> <li>- Accepts responsibility (Cattell et al, 1992)</li> <li>- Hard to the point of cynicism (Cattell et al, 1992)</li> <li>- Limited in artistic fantasies, whilst not lacking taste (Cattell et al, 1992)</li> <li>- Unaffected by fancies (Cattell et al, 1992)</li> <li>- Acts on practical, logical evidence (Cattell et al, 1992)</li> <li>- Sticks to the point (Cattell et al, 1992)</li> <li>- Does not dwell on physical disabilities (Cattell et al, 1992)</li> <li>- Tough (Cattell et al, 1992)</li> <li>- Masculine (Cattell et al, 1992)</li> <li>- Mature (Cattell et al, 1992)</li> <li>- Realistic (Cattell et al, 1992)</li> </ul>	9,76**	0,259
	SORT24 (-)	Low impulsiveness	<ul style="list-style-type: none"> <li>- Plans deliberately to secure power (Winter &amp; Stewart, 1978)</li> </ul>	6,41**	0,275

F = Significance of inclusion of the variable

Multiple R = Degree of prediction of the combined variables at that step

THREE-WAY ANOVA

Factor	Main Effects				Interactions			
	Gender	Language	Managerial status	Overall	GxL	GxM	LxM	GxLxM
I	0,05	0,13	0,30	0,15	2,14	0,45	3,09*	2,64
II	4,60*	3,81*	0,001	3,07*	0,72	0,52	0,70	1,15
III	4,20*	0,20	0,01	1,15	5,37**	0,09	1,02	0,84
IV	0,76	1,34	0,00	0,86	7,02**	0,18	5,30**	0,03
V	0,10	4,55*	0,26	2,35	3,30*	0,09	1,87	0,01
VI	0,24	3,33*	5,81*	3,15*	1,15	1,15	3,56*	0,74
VII	6,44*	2,77	4,46*	4,08**	0,23	0,00	1,71	0,69
VIII	33,38**	0,84	2,07	9,36**	3,02	0,01	0,35	0,02
df	1,356	2,356	2,356	4,356	2,356	1,356	2,356	2,356

\*p< 0.05    \*\*p<0.01    = Levels of significance  
df                = Degrees of freedom  
GxL              = Gender x Language  
GxM              = Gender x Managerial status  
LxM              = Language x Managerial status  
GxLxM           = Gender x Language x Managerial status

t- TESTS

Factor	Gender	Language			Managerial Status
		E vs I	A vs I	E vs A	
I	-0,21	-0,53	-0,22	-0,27	0,54
II	2,15*	-1,29	-2,68**	1,54	0,05
III	-2,04*	0,59	0,48	0,09	-0,13
IV	-0,86	-1,61	-0,76	-0,83	-0,04
V	-0,28	2,66**	0,06	2,68**	0,46
VI	0,53	2,35*	0,17	2,06	2,35*
VII	-2,50*	1,55	2,29**	-0,83	2,06*
VIII	5,80**	0,31	-0,93	1,24	1,44
df	355	235	235	236	355

\* p<0.05    \*\* p<0.01    = Levels of significance

All t-tests were performed using the equivalent variance model as all variances between groups were found to be homogenous..

MANTEL-HAENSZEL TEST

Factor	M-H Index	Factor	M-H Index
I	0,038	V	0,202
II	1,214	VI	1,229
III	6,422**	VII	7,042**
IV	2,605	VIII	0,730

\*\*0.001 = Level of significance

NORMS

ENGLISH FIRST LANGUAGE									
		RAW SCORES							
FACTORS		I	II	III	IV	V	VI	VII	VIII
DESCRIPTION	STEN	Task Orientation - Directive	Task Orientation Conscientious	Emotional Stability	Extroverted Interpersonal Orientation	Independence	Conceptualisation	Openness to Experience	Need for Power
Strongly inclined towards	10	109+	30+	30+	74+	31+	24+	39+	14+
	9	96-108	26-29	27-29	68-73	30	23	33-38	13-13
Inclined towards	8	89-95	25	25	60-67	24-29	18-22	-	-
	7	82-88	22-24	23-24	58-59	23	17	28-32	-
Balanced orientation	6	74-81	20-21	22	54-57	-	16	-	5-9
	5	68-73	19	20-21	48-53	-	-	25-27	-
Inclined towards	4	64-67	16	19	44-47	17-22	11-15	24	1-4
	3	57-63	15-17	17-18	38-43	16	10	20-23	-
Strongly inclined towards	2	45-56	11-14	12-16	29-37	15	8-9	19	-
	1	0-44	0-10	0-11	0-28	0-14	0-7	0-18	-
DESCRIPTION	STEN	Task orientation considerate (democratic)	Task orientation less conscientious	Emotionality	Introverted interpersonal orientation	Dependence	Conceptualisation-concrete	Conventionality	Low need for power

AFRIKAANS FIRST LANGUAGE									
		RAW SCORES							
FACTORS		I	II	III	IV	V	VI	VII	VIII
DESCRIPTION	STEN	Task Orientation - Directive	Task Orientation Conscientious	Emotional Stability	Extroverted Inter-personal Orientation	Independence	Conceptualisation	Openness to Experience	Need for Power
Strongly inclined towards	10	115+	31+	30+	72+	31+	23+	41+	14+
	9	96-114	26-29	27-30	68-71	24-30	-	36-40	10-13
Inclined towards	8	92-95	23-25	25-26	62-67	-	18-22	33-35	-
	7	83-91	21-22	23-24	60-61	23	16-17	-	5-9
Balanced orientation	6	74-82	19-20	-	56-59	17-22	15	28-32	-
	5	68-73	15-18	20-22	52-55	16	11-14	24-27	-
Inclined towards	4	65-67	14	19	46-51	-	10	-	-
	3	53-64	13	16-18	38-45	15	8-9	19-23	1-4
Strongly inclined towards	2	43-52	11-12	12-15	30-37	9-14	3-7	16-18	-
	1	0-42	0-10	0-11	0-29	0-8	0-2	0-15	-
DESCRIPTION	STEN	Task orientation con-siderate (demo-cratic)	Task orientation less consc-ientious	Emo-tionality	Introver-ted interper-sonal orientation	Depen-dence	Concep-tual-isation - concrete	Conven-tionality	Low need for power

INDIGENOUS FIRST LANGUAGE									
		RAW SCORES							
FACTORS		I	II	III	IV	V	VI	VII	VIII
DESCRIPTION	STEN	Task Orientation - Directive	Task Orientation Conscientious	Emotional Stability	Extroverted Interpersonal Orientation	Independence	Conceptualisation	Openness to Experience	Need for Power
Strongly inclined towards	10	107+	36+	28+	76+	31+	23+	34+	14+
	9	99-106	32-35	26-27	72-75	24-30	18-22	32-33	10-13
Inclined towards	8	86-98	28-31	24-25	64-71	-	-	29-31	9
	7	81-85	24-27	23	60-63	23	16-17	28	6-8
Balanced orientation	6	76-80	21-23	20-22	58-59	18-22	15	25-27	5
	5	70-75	19-20	19	51-57	16-17	11-14	24	-
Inclined towards	4	65-69	18	-	46-50	-	-	20-23	1-4
	3	58-64	14-17	16-18	40-45	11-15	10	19	-
Strongly inclined towards	2	47-57	11-13	15	32-39	8-10	3-9	16-18	-
	1	0-46	0-10	0-14	0-31	0-7	0-2	0-15	-
DESCRIPTION	STEN	Task orientation considerate (democratic)	Task orientation less conscientious	Emotionality	Introverted interpersonal orientation	Dependence	Conceptualisation - concrete	Conventionality	Low need for power

**BANDS**

		RAW SCORES							
FACTORS		I	II	III	IV	V	VI	VII	VIII
DESCRIPTION	STEN	Task Orientation - Directive	Task Orientation Conscientious	Emotional Stability	Extroverted Interpersonal Orientation	Independence	Conceptualisation	Openness to Experience	Need for Power
Strongly inclined towards	10	94+	27+	26+	66+	25+	20+	33+	11+
Inclined towards	8	79-93	21-26	23-25	57-65	21-24	16-19	29-32	7-10
Balanced orientation	6	67-78	18-20	20-22	48-56	17-20	12-15	24-28	4-6
Inclined towards	4	51-66	13-17	15-19	35-47	13-16	7-11	19-23	1-3
Strongly inclined towards	2	0-50	0-12	0-14	0-34	0-12	0-6	0-18	-
DESCRIPTION	STEN	Task orientation considerate (democratic)	Task orientation less conscientious	Emotionality	Introverted interpersonal orientation	Dependence	Conceptualisation - concrete	Conventionality	Low need for power



## GRAPHOLOGICAL FACTOR DESCRIPTORS FROM THE LITERATURE

FAC-TOR	LABEL	LOW SCORER DESCRIPTORS	HIGH SCORER DESCRIPTORS
I	Task orientation-directive	<ul style="list-style-type: none"> <li>- Adopts a consideration style, democratic (Schultz &amp; Schultz, 1998)</li> </ul>	<ul style="list-style-type: none"> <li>- Adopts an initiating structure style (Hollander, 1985) authoritarian (Schultz &amp; Schultz, 1998)</li> <li>- Directs and defines work and its execution (Schultz &amp; Schultz, 1998)</li> <li>- Assigns tasks and monitors tasks for accuracy (Schultz &amp; Schultz, 1998)</li> <li>- Ensures quality work within a short time frame (Schultz &amp; Schultz, 1998)</li> <li>- Ensures that standards are met consistently (Schultz &amp; Schultz, 1998)</li> <li>- Tells subordinates what to do and responds appropriately where stressful situations require high productivity and rapid job performance (Schultz &amp; Schultz, 1998)</li> </ul>
II	Task orientation - conscientious		<ul style="list-style-type: none"> <li>- Achievement orientated (Costa et al, 1991)</li> <li>- Responsible, dependable (Digman, 1990)</li> <li>- Competent (Costa et al, 1991)</li> <li>- Focuses on a few goals, with purpose (Digman, 1990)</li> <li>- Self disciplined (Costa et al, 1991)</li> <li>- Persistent (Digman, 1990)</li> <li>- Strives for excellence (Costa et al, 1991)</li> </ul>
III	Emotional stability	<ul style="list-style-type: none"> <li>- Experiences unpleasant emotions easily (Costa et al, 1991)</li> </ul>	<ul style="list-style-type: none"> <li>- Withstands stress, calm, enthusiastic, secure (Digman, 1990)</li> </ul>
IV	Extroverted interpersonal orientation		<ul style="list-style-type: none"> <li>- Extroverted (Costa et al, 1991)</li> <li>- Experiences strong, fast developing and slowly dissipating inhibitions (Melamed &amp; Bozionelis, 1992)</li> <li>- Intolerant of routine work (Melamed &amp; Bozionelis, 1992)</li> <li>- Interpersonally orientated (Goleman, 1995)</li> </ul>
V	Independence	<ul style="list-style-type: none"> <li>- Values harmony (Digman, 1990)</li> <li>- Considers the needs of others (Digman, 1990)</li> <li>- Compassionate (Costa et al, 1991)</li> </ul>	<ul style="list-style-type: none"> <li>- Wants own way and say (Digman, 1990)</li> <li>- Focuses on own needs (Digman, 1990)</li> <li>- Changes or circumvents rules to suit the situation (Digman, 1990)</li> </ul>
VI	Conceptualisation	<ul style="list-style-type: none"> <li>- Does not think strategically (Hogan, 1989)</li> <li>- Does not learn from experience (Hogan, 1989)</li> </ul>	<ul style="list-style-type: none"> <li>- Intelligent (Lord, de Vader &amp; Alliger, 1986; Melamed &amp; Bozionelis, 1992)</li> <li>- Curious (Digman, 1990)</li> <li>- Open to experience (Digman, 1990)</li> <li>- Acquires and applies knowledge (Howard &amp; Howard, 1995; Stodgill, 1984)</li> <li>- Has common sense (Sternberg et al, 1995)</li> <li>- Exercises Judgement (Stodgill, 1984)</li> <li>- Decisive (Stodgill, 1984)</li> <li>- Fluent in speech (Stodgill, 1984)</li> <li>- Creates, processes and disperses information (Jencks, 1989)</li> </ul>
VII	Openness to experience		<ul style="list-style-type: none"> <li>- Enjoys new experiences (Costa et al, 1991)</li> <li>- Innovative, imaginative, intrigued by novelty (Digman, 1990)</li> <li>- Creative (Digman, 1990)</li> <li>- Intellectual (Digman, 1990)</li> </ul>
VIII	Need for power		<ul style="list-style-type: none"> <li>- Concerned with results above popularity (Conger, 1990)</li> <li>- Makes tough decisions (Conger, 1990)</li> </ul>

RECONCILIATION OF NEW 7GFS AND ORIGINAL 7GFS ITEMS AND FACTORS

New 7GFS Factors		Original 7GFS Factors	
I	Task Orientation - Directive [TOD]	1	Proactivity
II	Task Orientation- Conscientious [TOC]	2	Thoroughness
III	Emotional Stability [ES]	3	Purposefulness
IV	Extroverted Interpersonal Orientation [EIO]	4	Conventionality
V	Independence [IND]	5	Honesty
VI	Conceptualisation [CN]	6	Achievement
VII	Openness to Experience [OTE]	7	Precision
VIII	Need for Power [NFP]		

New 7GFS Secondary Factor	Original 7GFS Factor	Item	Description	Measures	New 7GFS Weight	Original 7GFS Weight
I TOD	3	10	spacing close	<ul style="list-style-type: none"> <li>- Coordination (Branston, 1990, p.50)</li> <li>- Clear communication of facts (Mendel, 1975, p.22)</li> <li>- Clear thinking (Singer, 1974, p.43)</li> <li>- Self confidence (Branston, 1990, p.50)</li> <li>- Confidence (Mendel, 1975, p.72)</li> <li>- Observance (Branston, 1990, p.50)</li> <li>- Extroversion (Mendel, 1975, p.72)</li> </ul>	0,41	-0,31
	2	32	rhythmic	<ul style="list-style-type: none"> <li>- Reliability (Branston, 1990, p.44)</li> <li>- Decisiveness (Nezos, 1989, p.168)</li> <li>- Logic (Branston, 1990, p.71)</li> <li>- Objectivity (Nezos, 1989, p.168)</li> <li>- Determination (Nezos, 1989, p.106)</li> <li>- Optimism (Nezos, 1989, p.168)</li> <li>- Adaptability (Branston, 1990, p.103)</li> <li>- Confidence (Nezos, 1989, p.168)</li> <li>- Flexibility (Branston, 1990, p.153)</li> <li>- Independence (Nezos, 1989, p.168)</li> </ul>	0,62	0,71
	2	37	structured	<ul style="list-style-type: none"> <li>- Maturity (Nezos, 1989, p.171)</li> <li>- Organisation (Nezos, 1989, p.166)</li> <li>- Action orientation (Nezos, 1989, p.171)</li> <li>- Creativity (Nezos, 1989, p.171)</li> </ul>	0,68	0,73
	2	38	coordinated	<ul style="list-style-type: none"> <li>- Coordination ability (Singer, 1974, p.36)</li> </ul>	0,63	0,58
	3	39	natural	<ul style="list-style-type: none"> <li>- Natural expressiveness (Myer, 1968, pp. 18-23)</li> <li>- Tolerance (Branston, 1990, p.76)</li> <li>- Capacity for endurance (Myer, 1968, p.25)</li> <li>- Organisational ability (Branston, 1990, p.76)</li> <li>- Reliability (Branston, 1990, p.135)</li> <li>- Methodical approach (Branston, 1990, p.76)</li> <li>- Orderliness (Branston, 1990, p.76)</li> </ul>	0,46	0,35

New 7GFS Secondary Factor	Original 7GFS Factor	Item	Description	Measures	New 7GFS Weight	Original 7GFS Weight
	2	31	regular	<ul style="list-style-type: none"> <li>- Leadership (Hill, 1981, p.138; Meyer, 1968, p.33; Singer, 1974, p.29)</li> <li>- Warmth (Branston, 1990, p.109)</li> <li>- Conscientiousness (Marley, 1967, p.74; Myer, 1968, p.148)</li> <li>- Organisational ability (Branston, 1990, p.135).</li> <li>- Orderliness (Myer, 1968, p.25; Nezos, 1989, p.121).</li> <li>- Methodical approach (Branston, 1990, p.135).</li> <li>- Self-discipline (Branston, 1990, p.135; Nezos, 1989, p.122; Singer, 1969, p. 91; Singer, 1974, p.40).</li> <li>- Responsibility (Nezos, 1989, p.138)</li> <li>- Tenacity (Marley, 1967, p.74; Myer, 1968, p.148).</li> <li>- Endurance (Branston, 1990, p.135; Myer, 1968, p.25)</li> <li>- Honesty (Nezos, 1989, p.152)</li> <li>- Determination (Myer, 1968, p.148)</li> <li>- Capacity for hard work (Branston, 1990, p.136)</li> <li>- Capacity to work steadily (Singer, 1969, p. 94)</li> <li>- Decisiveness (Myer, 1968, p.25)</li> <li>- Independence (Marley, 1967, p.40; Myer, 1968, p.33)</li> <li>- Energy (Greene &amp; Lewis, 1980, p.246; Myer, 1968, p.148)</li> <li>- Calmness (Myer, 1968, p.25)</li> </ul>	0,48	0,92
	6	33	stable baseline	<ul style="list-style-type: none"> <li>- Dependability (Olyanova, 1970, p.283)</li> <li>- Frankness (Hill, 1981, p.135)</li> <li>- Truthfulness (Hill, 1981, p.143)</li> <li>- Commitment (Hill, 1981, p.135)</li> <li>- Independence (Hill, 1981, p.137; Mendel, 1975, p.160)</li> <li>- Loyalty (Hill, 1981, p.135)</li> </ul>	0,73	0,36
	6	35	one letter stops short of baseline	<ul style="list-style-type: none"> <li>- Carefulness (Nezos, 1989, p.173)</li> </ul>	-0,79	0,64
	3	36	legible	<ul style="list-style-type: none"> <li>- Extroversion (Branston, 1990, p.71)</li> <li>- Self assurance (Branston, 1990, p.194)</li> <li>- Speaking ability (Hill, 1981, p.142)</li> <li>- Cooperation (Mendel, 1975, p.146)</li> <li>- Organisation (Nezos, 1989, p.166)</li> <li>- Mentally agile (Branston, 1990, p.71)</li> <li>- Attention to detail (Marley, 1967, p.108)</li> <li>- Flexibility (Branston, 1990, p.71)</li> <li>- Trustworthiness (Hill, 1981 p.143)</li> <li>- Reliability (Branston, 1990, p.44)</li> <li>- Honesty (Hill, 1981, p.136)</li> <li>- Industriousness (Branston, 1990, p. 194)</li> <li>- Purposefulness (Branston, 1990, p.89; Marley, 1967, p.108; Mendel, 1975, p.146)</li> <li>- Intelligence (Amend &amp; Ruiz, 1980, p. 92)</li> <li>- Logic (Branston, 1990, p.71)</li> </ul>	0,37	0,40
	1	25	pressure horizontal	<ul style="list-style-type: none"> <li>- Logic (Branston, 1990, p.103)</li> </ul>	-0,89	0,23

New 7GFS Secondary Factor	Original 7GFS Factor	Item	Description	Measures	New 7GFS Weight	Original 7GFS Weight
	2	26	pressure regular	<ul style="list-style-type: none"> <li>- Diligence (Mendel, 1975, p.125)</li> <li>- Reliability (Myer, 1968, p.148; Singer, 1969, p.94; Singer, 1974, p.41)</li> <li>- Intelligent (Mendel, 1975, p.125)</li> </ul>	0,86	0,42
	6	5	straight lines	<ul style="list-style-type: none"> <li>- Calmness (Nezos, 1989, p.180)</li> <li>- Orderliness (Branston, 1990, p.44; Mendel, 1975, p.80; Nezos, 1980, p.180)</li> <li>- Self discipline (Singer, 1974, p.31)</li> <li>- Responsibility (Branston, 1990, p.44)</li> <li>- Abstract thinking (Roman, 1952, p.83)</li> </ul>	0,78	0,76
	6	12	margin - upper narrow	<ul style="list-style-type: none"> <li>- Respectfulness (Mendel, 1975, p.62)</li> <li>- Informality in attitude (Branston, 1990, p.36)</li> <li>- Directness (Mendel, 1975, p.62)</li> </ul>	0,67	0,55
	6	34	straight baseline	<ul style="list-style-type: none"> <li>- Responsibility (Nezos, 1989, p.182)</li> <li>- Self control (Branston, 1990, p.44; Nezos, 1989, p.180)</li> <li>- Consistency (Nezos, 1989, p.182)</li> <li>- Orderliness (Branston, 1990, p.80; Nezos, 1989, p.180)</li> <li>- Tenacity (Nezos, 1989, p.182)</li> </ul>	0,72	0,69
II TOC	4	57	I dot low right of stem	<ul style="list-style-type: none"> <li>- Planning (Marley, 1967, p.137)</li> <li>- Coordination (Marley, 1967, p.136)</li> <li>- Action orientation (Marley, 1967, p.137)</li> <li>- Independence (Marley, 1967, p.136)</li> </ul>	-0,77	0,20
	4	58	I dot low directly above stem	<ul style="list-style-type: none"> <li>- Planning (Marley, 1967, p.136)</li> <li>- Conscientiousness (Hill, 1981, p.134; Myer, 1968, p.36)</li> <li>- Attention to detail (Marley, 1967, p.134)</li> <li>- Concentration (Hill, 1981, p.133)</li> <li>- Practicality (Marley, 1967, p.137)</li> </ul>	0,81	0,50
	7	60	I dot exactly above stem	<ul style="list-style-type: none"> <li>- Attention to detail (Olyanova, 1970, p.286)</li> <li>- Positive attitude (Marley, 1967, p.137)</li> <li>- Conscientiousness (Hill, 1981, p.134)</li> <li>- Planning (Marley, 1967, p.138)</li> </ul>	0,86	-0,33
	3	27	normal pressure t- bar	<ul style="list-style-type: none"> <li>- Reliability (Branston, 1990, p.159)</li> </ul>	0,82	0,39
	4	28	t-bar crosses midpoint	<ul style="list-style-type: none"> <li>- Conscientiousness (Marley, 1967, p.140)</li> <li>- Attention to detail (Marley, 1967, p.140)</li> </ul>	0,55	0,64
	2	30	strong balanced t- bar	<ul style="list-style-type: none"> <li>- Conscientiousness (Olyanova, 1970, p.283)</li> <li>- Dependability (Olyanova, 1970, p.283)</li> </ul>	-0,72	0,20
	4	15	upper lean	<ul style="list-style-type: none"> <li>- Ethical (Myer, 1968, p.169)</li> <li>- Rational thinking (Myer, 1968, p.169)</li> </ul>	0,43	0,74
	1	43	word size increases	<ul style="list-style-type: none"> <li>- Frankness (Singer, 1969, p.29; Singer, 1974, p.30)</li> <li>- Sincerity (Hill, 1981, p.142; Singer, 1969, p.90)</li> <li>- Impulsivity (Olyanova, 1970, p.314)</li> </ul>	-0,27	0,23

New 7GFS Secondary Factor	Original 7GFS Factor	Item	Description	Measures	New 7GFS Weight	Original 7GFS Weight
	5	53	o closed	<ul style="list-style-type: none"> <li>- Judgement (Hill, 1981, p.138)</li> <li>- Dependability (Olyanova, 1970, p. 283)</li> <li>- Honesty (Hill, 1981, p.138)</li> </ul>	0,69	0,75
III ES	1	6	spacing in letters narrow	<ul style="list-style-type: none"> <li>- Concentration (Nezos, 1989, p.115)</li> <li>- Practicality (Branston, 1990, p.101)</li> <li>- Applies reason (Marley, 1967, p.84; Mendel, 1975, p.160; Myer, 1968, p.58)</li> </ul>	0,37	-0,81
	1	13	small	<ul style="list-style-type: none"> <li>- Tolerance (Marley, 1967, p.43; Myer, 1968, p.32)</li> <li>- Conscientiousness (Marley, 1967, p.114)</li> <li>- Accuracy ((Branston, 1990, p.19; Marley, 1967, p.43; Singer, 1974, p. 30)</li> <li>- Attention to detail (Marley, 1967, p.143)</li> <li>- Self discipline (Singer, 1974, p.31)</li> <li>- Adaptability (Marley, 1967, p.43)</li> <li>- Concentration (Amend &amp; Ruiz, 1980, p.50; Hill, 1981, p.133; Marley, 1967, p.43; Mendel, 1975, p.140; Myer, 1968, p.63)</li> <li>- Objectivity (Hill, 1981, p.138)</li> <li>- Theoretical orientation (Marley, 1967, p.43)</li> <li>- Individuality (Marley, 1967, p.43)</li> <li>- Judgement (Hill, 1981, p.138)</li> </ul>	0,78	-0,23
	1	16	middle small	<ul style="list-style-type: none"> <li>- Emotional control (Mendel, 1975, p.161)</li> <li>- Ambition (Branston, 1990, p.23)</li> <li>- Objectivity (Mendel, 1975, p.161)</li> </ul>	0,79	-0,60
	1	17	middle zone large	<ul style="list-style-type: none"> <li>- Self assurance (Myer, 1968, p.50)</li> <li>- Sociability (Myer, 1968, p.50)</li> <li>- Richness of inner values (Myer, 1968, p.50)</li> </ul>	0,73	0,48
	1	19	middle full wide	<ul style="list-style-type: none"> <li>- Warmth (Branston, 1990, p.25)</li> <li>- Logic (Singer, 1969, p.88)</li> <li>- Self-confidence (Branston, 1990, p.25)</li> <li>- Individuality (Branston, 1990, p.95)</li> <li>- Sensitivity (Branston, 1990, p.25)</li> </ul>	0,62	0,84
	5	42	left-tending movements	<ul style="list-style-type: none"> <li>- Independence (Myer, 1968, p.120)</li> <li>- Self -reliance (Myer, 1968, p.120)</li> </ul>	0,35	0,31
	1	44	full letters	<ul style="list-style-type: none"> <li>- Empathy (Olyanova, 1970, p.315)</li> </ul>	0,69	0,85
EIO	4	1	right slant	<ul style="list-style-type: none"> <li>- Attentiveness (Mendel, 1975, p.106)</li> <li>- Extroversion (Greene &amp; Lewis, 1980, p.247; Nezos, 1989, p.186; Olyanova, 1970, pp.20-21; Singer, 1969, p.91)</li> <li>- Desire to communicate (Marley, 1967, 46)</li> <li>- Ease of contact (Nezos, 1989, p. 186)</li> <li>- Friendliness (Hill, 1981, p.135)</li> <li>- Agreeableness (Mendel, 1975, p.106)</li> <li>- Warmth (Hill, 1981, p.144)</li> <li>- Frankness (Branston, 1990, p.98)</li> <li>- Receptivity (Mendel, 1975, p.106)</li> <li>- Sociability (Branston, 1990, pp.21-28; Myer, 1968, p.60; Olyanova, 1970, p.21)</li> </ul>	0,41	-0,22

New 7GFS Secondary Factor	Original 7GFS Factor	Item	Description	Measures	New 7GFS Weight	Original 7GFS Weight
IV EIO	4	1	right slant	<ul style="list-style-type: none"> <li>- Social ease (Marley, 1967, p. 45)</li> <li>- Spontaneity (Branston, 1990, p.98; Marley, 1967, p.45; Mendel, 1975, p.106)</li> <li>- Empathy (Marley, 1967, p.46)</li> <li>- Cooperation (Hill, 1981, p.134)</li> <li>- Honesty (Hill, 1981, p.136)</li> <li>- Action orientation (Mendel, 1975, p.101)</li> <li>- Activity (Branston, 1990, p.108; Marley, 1967, p.45; Myer, 1968, p.60)</li> <li>- Drive (Branston, 1990, p.98)</li> <li>- Energy in females (Mendel, 1975, p.106)</li> <li>- Adaptability (Branston, 1990, p.67; Marley, 1967, p.43; Mendel, 1975, p.106; Myer, 1968, p.60; Nezos, 1989, p. 186; Roman, 1952, p.219)</li> <li>- Sincerity in females (Mendel, 1975, p.106)</li> <li>- Compliance (Roman, 1952, p.187)</li> <li>- Optimism in males (Mendel, 1975, p.106)</li> <li>- Impulsivity (Olyanova, 1970, p.21)</li> <li>- Industriousness in males (Mendel, 1975, p.106)</li> <li>- Devotion (Myer, 1968, p.64)</li> <li>- Independence in males (Mendel, 1975, p.106)</li> <li>- Achievement orientation (Singer, 1974, p.33)</li> <li>- Ambition (Mendel, 1975, p.106)</li> <li>- Commitment (Myer, 1968, p.64)</li> <li>- Receptivity (Mendel, 1975, p.106)</li> </ul>		
	5	3	connected	<ul style="list-style-type: none"> <li>- Social orientation (Branston, 1990, p. 72; Marley, 1967, p.102)</li> <li>- Planning (Marley, 1967, p.102; Myer, 1968, p.33)</li> <li>- Cooperation (Marley, 1967, p.102; Myer, 1968, p.81)</li> <li>- Adaptability (Branston, 1990, p.72; Myer, 1968, p.81; Nezos, 1989, p.151; Singer, 1974, p.34)</li> <li>- Persistence (Marley, 1967, p.102)</li> <li>- Perseverance (Nezos, 1989, p.151)</li> <li>- Calculation and strategy (Marley, 1967, p.102)</li> <li>- Action orientation (Nezos, 1989, p.151)</li> <li>- Concern with future goals (Amend &amp; Ruiz, 1980, p.106). - Goal-mindedness (Marley, 1967, p.102)</li> <li>- Purposefulness (Branston, 1990, p.72; Marley, 1967, p.102)</li> <li>- Concentration (Singer, 1974, p.34)</li> <li>- Consequential thinking (Myer, 1968, p.81)</li> <li>- Systematic thinking (Marley, 1967, p.102)</li> <li>- Deductive reasoning (Marley, 1967, p.102; Nezos, 1989, p.151)</li> <li>- Application of reason (Marley, 1967, p.102)</li> <li>- Logic (Branston, 1990, p.71; Mendel, 1975, p.193; Myer, 1968, p.68; Singer, 1969, p. 90; Singer, 1974, p.34)</li> <li>- Productive intelligence (Myer, 1968, p.81; Nezos, 1989, p.149)</li> <li>- Memory (Amend &amp; Ruiz, 1980, p.106; Nezos, 1989, p.151; Singer, 1969, p.93; Singer, 1974, p.34)</li> <li>- Abstract thinking (Marley, 1967, p.102)</li> </ul>	0,76	0,21

New 7GFS Secondary Factor	Original 7GFS Factor	Item	Description	Measures	New 7GFS Weight	Original 7GFS Weight
	3	4	disconnected	<ul style="list-style-type: none"> <li>- Receptivity (Nezos, 1989, p.152)</li> <li>- Maturity (Marley, 1967, p.109)</li> <li>- Understanding of others (Marley, 1967, p.109)</li> <li>- Cooperation (Hill, 1981, p.134)</li> <li>- Attention to detail (Singer, 1974, p.34)</li> <li>- Self reliance (Branston, 1990, p.74; Marley, 1967, p.103; Mendel, 1967, p.103; Myer, 1968, p.84)</li> <li>- Individuality (Amend &amp; Ruiz, 1980, p.109; Branston, 1990, p.74; Marley, 1967, p.109; Myer, 1968, p.84).</li> <li>- Adaptability (Marley, 1967, p.103)</li> <li>- Creativity (Amend &amp; Ruiz, 1980, p.109)</li> <li>- Observance (Branston, 1990, p.74; Hill, 1981, p.139; Singer, 1969, p.90)</li> <li>- Sensitivity (Amend &amp; Ruiz, 1980, p.108)</li> <li>- Planning (Marley, 1967, p.103)</li> <li>- Imagination (Branston, 1990, p.74; Marley, 1967, p.103; Singer, 1974, p.34)</li> <li>- Logic (Nezos, 1989, p.151; Marley, 1967, p.10; Singer, 1969, p.88)</li> <li>- Flexibility (Marley, 1967, p.109)</li> </ul>	-0,59	0,55
	3	45	concealing strokes first letter	<ul style="list-style-type: none"> <li>- Ambition (Mendel, 1975, p.209)</li> <li>- Shrewdness (Mendel, 1975, p.209)</li> </ul>	0,64	-0,52
	4	56	l decent size	<ul style="list-style-type: none"> <li>- Self esteem (Branston, 1990, p.21)</li> <li>- Confidence (Branston, 1990, p.21)</li> </ul>	0,46	0,52
	2	48	careful punctuation	<ul style="list-style-type: none"> <li>- Thoroughness (Olyanova, 1970, p.287)</li> </ul>	0,77	0,28
	2	49	exact commas	<ul style="list-style-type: none"> <li>- Attention to detail (Singer, 1969, p.94)</li> <li>- Accuracy (Singer, 1969, p.94)</li> </ul>	0,77	0,22
	1	14	relative	<ul style="list-style-type: none"> <li>- Use of concepts (Myer, 1968, p.52)</li> <li>- Abstract thinking (Myer, 1968, p.52)</li> </ul>	0,71	-0,31
		18	middle major	<ul style="list-style-type: none"> <li>- Determination (Marley, 1967, p.36)</li> <li>- Self - assurance (Branston, 1990, p.23)</li> <li>- Sociability (Hill, 1981, p.142)</li> <li>- Firmness (Marley, 1967, p.36)</li> <li>- Balance in outlook (Marley, 1967, p.36)</li> </ul>	-0,74	0,52
	1	20	lower long extensions	<ul style="list-style-type: none"> <li>- Sociability (Greene &amp; Lewis, 1980, p.250)</li> <li>- Observance (Mendel, 1975, p.139)</li> <li>- Extroversion (Greene &amp; Lewis, 1980, p.250)</li> <li>- Organisational inclination (Marley, 1967, p.36)</li> <li>- Practicality (Branston, 1990, p.23; Marley, 1967, p.102; Myer, 1968, p.54)</li> <li>- Attention to detail (Mendel, 1975, p.139)</li> </ul>	0,75	-0,36
V IND	6	8	line spacing narrow	<ul style="list-style-type: none"> <li>- Creativity (Branston, 1990, p.41)</li> <li>- Action orientation (Branston, 1990, p.41)</li> </ul>	-0,64	0,38
	6	9	line spacing medium	<ul style="list-style-type: none"> <li>- Organisation in daily routine (Roman, 1952, p.293)</li> <li>- Consequential thinking (Meyer, 1968, p. 81)</li> </ul>	0,83	0,59

New 7GFS Secondary Factor	Original 7GFS Factor	Item	Description	Measures	New 7GFS Weight	Original 7GFS Weight
	3	11	general spacing medium	<ul style="list-style-type: none"> <li>- Communicativeness (Branston, 1990, p.30)</li> <li>- Reliability (Branston, 1990, p.108)</li> <li>- Coordination (Singer, 1969, pp.90-93)</li> <li>- Perceptive intelligence (Roman, 1952, p.50)</li> <li>- Intelligence (Branston, 1990, p.203; Hill, 1981, p.137; Singer, 1969, p.89)</li> <li>- Judgement (Olyanova, 1970, p.73)</li> <li>- Orderliness (Amend &amp; Ruiz, 1980, p.52; Branston, 1990, p. 30; Roman, 1952, p.293)</li> <li>- Convictions (Mendel, 1975, p.126)</li> </ul>	0,82	0,41
	3	40	simplified	<ul style="list-style-type: none"> <li>- Spontaneity (Hill, 1981, p.142; Mendel, 1975, p.200)</li> <li>- Maturity (Marley, 1967, p.166; Myer, 1968, p.175)</li> <li>- Orderliness (Marley, 1967, p.166; Mendel, 1975, p.177)</li> <li>- Honesty (Hill, 1981, p.142)</li> <li>- Adaptability (Nezos, 1989, p.124)</li> <li>- Creativity (Marley, 1967, p.166)</li> <li>- Concentration (Hill, 1981, p.133; Marley, 1967, p.166; Singer, 1969, p.94)</li> <li>- Intelligence (Greene &amp; Lewis, 1989, p.244; Hill, 1981, p.137; Singer, 1969, p.89; Singer, 1974, p.41)</li> <li>- Logic (Branston, 1990, p.71)</li> <li>- Adaptability (Nezos, 1989, p.124)</li> <li>- Objectivity (Branston, 1990, p.89; Marley, 1967, p.166; Singer, 1974, p.41)</li> <li>- Practicality (Marley, 1967, p.166)</li> <li>- Judgement (Marley, 1967, p.166; Myer, 1968, p.175)</li> <li>- Mental agility (Branston, 1990, pp. 88-89)</li> </ul>	0,71	0,79
	3	41	direct, no roundabouts	<ul style="list-style-type: none"> <li>- Goal orientation (Singer, 1974, p.33)</li> <li>- Purposefulness (Singer, 1974, p.33)</li> <li>- Concentration (Singer, 1974, p.33)</li> </ul>	0,73	0,85
VI CN	3	21	lower straight	<ul style="list-style-type: none"> <li>- Independence (Amend &amp; Ruiz, 1980, p.21)</li> <li>- Concentration (Hill, 1981, p.133; Singer, 1969, p.94)</li> <li>- Judgment (Olyanova, 1970, p.302)</li> <li>- Efficiency (Amend &amp; Ruiz, 1980, p.87)</li> </ul>	0,66	0,24
	5	22	lower pulled forward	<ul style="list-style-type: none"> <li>- Extroversion (Hartford, 1986, p.177)</li> </ul>	-0,76	0,39
	1	7	between letters narrow	<ul style="list-style-type: none"> <li>- Practicality (Branston, 1990, p.101)</li> <li>- Dependability (Branston, 1990, p.101)</li> <li>- Application of reason (Marley, 1967, p.84; Mendel, 1975, p.160; Myer, 1968, p.58)</li> <li>- Tact (Branston, 1990, p.101; Marley, 1967, p.84; Myer, 1968, p.58)</li> <li>- Self control (Singer, 1974, p.34)</li> <li>- Self-discipline (Singer, 1974, p.34)</li> </ul>	-0,49	-0,25
	1	59	l dot high right	<ul style="list-style-type: none"> <li>- Impulsivity (Amend &amp; Ruiz, 1980, p.122)</li> <li>- Action orientation (Marley, 1967, p.137)</li> <li>- Factual memory (Olyanova, 1970, p.286)</li> </ul>	0,71	-0,40



New 7GFS Secondary Factor	Original 7GFS Factor	Item	Description	Measures	New 7GFS Weight	Original 7GFS Weight
VII OTE	1	23	secondary pressure	<ul style="list-style-type: none"> <li>- Optimism (Mendel, 1975, p.126)</li> <li>- Sensitivity (Myer, 1968, p.155)</li> <li>- Adaptability (Mendel, 1975, p.126)</li> <li>- Expedience (Mendel, 1975, p.126)</li> <li>- Convictions (Mendel, 1975, p.126)</li> <li>- Maturity (Mendel, 1975, p.126)</li> <li>- Creativity (Mendel, 1975, p.126)</li> <li>- Consistency (Mendel, 1975, p.126)</li> </ul>	0,83	0,21
	1	24	light pressure	<ul style="list-style-type: none"> <li>- Sensitivity (Branston, 1990, p.25; Hill, 1981, p.141; Marley, 1967, p.77)</li> <li>- Receptivity (Marley, 1967, p.77)</li> <li>- Attention to detail (Branston, 1990, p.109)</li> <li>- Tolerance (Marley, 1967, p.77)</li> <li>- Flexibility (Marley, 1967, p.77)</li> <li>- Expedience (Marley, 1967, p.77)</li> </ul>	-0,87	-0,26
	4	50	a open	<ul style="list-style-type: none"> <li>- Confidence (Nezos, 1989, p.117)</li> </ul>	0,93	0,87
	4	51	a open top or right	<ul style="list-style-type: none"> <li>- Confidence (Nezos, 1989, p.117)</li> <li>- Dependability (Olyanova, 1970, p.283)</li> </ul>	0,92	0,83
	5	52	a closed	<ul style="list-style-type: none"> <li>- Sincerity (Hill, 1981, p.136)</li> <li>- Honesty (Hill, 1981, p.136)</li> <li>- Truthfulness (Hill, 1981, p.136)</li> </ul>	-0,79	0,80
	5	55	ovals normal small closed	<ul style="list-style-type: none"> <li>- Honesty (Amend &amp; Ruiz, 1980, p.84)</li> <li>- Determination (Amend &amp; Ruiz, 1980, p.84)</li> </ul>	-0,54	0,59
VIII NFP	4	15	Upper lean	<ul style="list-style-type: none"> <li>- Ethics (Myer, 1968, p.169)</li> <li>- Rational thinking (Myer, 1968, p.169)</li> </ul>	0,84	0,42
	1	2	Mix connected and disconnected	<ul style="list-style-type: none"> <li>- Adaptability (Branston, 1990, p.74)</li> <li>- Creativity (Branston, 1990, p.74)</li> <li>- Resourceful (Branston, 1990, p.74)</li> </ul>	0,92	0,28
	5	29	t - bar joins following letter	<ul style="list-style-type: none"> <li>- Fluency (Hill, 1981, p.144)</li> <li>- Mental agility (Branston, 1990, p.71)</li> <li>- Intelligence (Hill, 1981, p.137; Singer, 1969, p.89)</li> </ul>	0,38	0,36
	4	54	y formed like a 7	<ul style="list-style-type: none"> <li>- Judgement (Hill, 1981, p.138)</li> </ul>	0,42	0,68

7GFS DESCRIPTORS INCLUDING CORRELATED INFORMATION FROM THE 16PF, SORT AND TAT

FACTOR I TASK ORIENTATION - DIRECTIVE			
SOURCE		SCORER DESCRIPTORS	
		LOW	HIGH
WRITING			<ul style="list-style-type: none"><li>- Clear thinking (Singer, 1974)</li><li>- Creative (Nezos, 1989)</li><li>- A decision maker (Myer, 1968; Nezos, 1989)</li><li>- Objective (Nezos, 1989)</li><li>- Intelligent (Amend &amp; Ruiz, 1980; Mendel, 1975)</li><li>- Uses concepts in abstract thinking (Roman, 1952)</li><li>- Mentally agile (Branston, 1990)</li><li>- Extroverted (Branston, 1990; Mendel, 1975)</li><li>- Warm (Branston, 1990)</li><li>- Honest (Hill, 1981; Nezos, 1989)</li><li>- Truthful (Hill, 1981)</li><li>- Calm (Myer, 1968; Nezos, 1989)</li><li>- Frank (Hill, 1981)</li><li>- Direct in approach (Mendel, 1975)</li><li>- Respectful (Mendel, 1975)</li><li>- Informal in attitude (Branston, 1990)</li><li>- Speaking ability (Hill, 1981)</li><li>- Mature (Nezos, 1989)</li><li>- Optimistic (Nezos, 1989)</li><li>- Flexible, adaptable (Branston, 1990)</li><li>- Tolerant (Branston, 1990)</li><li>- Cooperative (Mendel, 1975)</li><li>- Observant (Branston, 1990)</li><li>- Careful (Nezos, 1989)</li><li>- Attentive to detail (Marley, 1967)</li></ul>
LITERATURE		<ul style="list-style-type: none"><li>- Adopts a consideration style, democratic (Schultz &amp; Schultz, 1998)</li></ul>	<ul style="list-style-type: none"><li>- Adopts an initiating structure style (Hollander, 1985), authoritarian (Schultz &amp; Schultz, 1998)</li><li>- Directs and defines work and its execution (Schultz &amp; Schultz, 1998)</li><li>- Assigns tasks and monitors tasks for accuracy (Schultz &amp; Schultz, 1998)</li><li>- Ensures quality work within a short time frame (Schultz &amp; Schultz, 1998)</li><li>- Ensures that standards are met consistently (Schultz &amp; Schultz, 1998)</li><li>- Tells subordinates what to do and responds appropriately where stressful situations require high productivity and rapid job performance (Schultz &amp; Schultz, 1998)</li></ul>
STEP-WISE	SORT Low Practical	<ul style="list-style-type: none"><li>- Thinks concretely (Louw, 1975)</li><li>- Approaches problem solving from definite details (Louw, 1975)</li><li>- Lacks creativity (Billings et al, 1993)</li></ul>	<ul style="list-style-type: none"><li>- Implements tasks practically through others (Billings et al, 1993)</li><li>- Approaches problems from definite details (Louw, 1975)</li></ul>

FACTOR I TASK ORIENTATION - DIRECTIVE			
SOURCE		SCORER DESCRIPTORS	
		LOW	HIGH
	16PF Assertive, dom- inance	<ul style="list-style-type: none"> <li>- Submissive (Karson &amp; O'Dell, 1974)</li> <li>- Unsure (Karson &amp; O'Dell, 1974)</li> <li>- Modest (Karson &amp; O'Dell, 1974)</li> <li>- Lighthearted (Karson &amp; O'Dell, 1974)</li> <li>- Cheerful (Karson &amp; O'Dell, 1974)</li> <li>- Timid (Karson &amp; O'Dell, 1974)</li> <li>- Modest (Karson &amp; O'Dell, 1974)</li> <li>- Conventional (Karson &amp; O'Dell, 1974)</li> </ul>	<ul style="list-style-type: none"> <li>- Perceived to be a leader (Lord et al, 1986)</li> <li>- Dominant (Melamed &amp; Bozionelis, 1992)</li> <li>- Assertive (Cattell et al, 1992)</li> <li>- Competitive (Cattell et al, 1970)</li> <li>- Concrete thinking (Billings et al, 1993)</li> <li>- Stubborn (Cattell et al, 1970)</li> <li>- Feels superior to others (Karson &amp; O'Dell, 1974)</li> <li>- Unimaginative (Billings et al, 1993)</li> <li>- Enjoys being in command (Karson &amp; O'Dell, 1974)</li> <li>- Enjoys controlling and criticising others (Karson &amp; O'Dell, 1974)</li> <li>- Friendly - dominant (Karson &amp; O'Dell, 1974)</li> <li>- Rises to challenges ((Karson &amp; O'Dell, 1974)</li> </ul>

FACTOR II TASK ORIENTATION - CONSCIENTIOUS			
SOURCE		SCORER DESCRIPTIONS	
		LOW	HIGH
WRITING			<ul style="list-style-type: none"> <li>- Conscientious (Hill, 1981; Marley, 1967; Myer, 1968; Olyanova, 1970)</li> <li>- Plans (Marley, 1967)</li> <li>- Ethical (Myer, 1968)</li> <li>- Action orientated (Marley, 1967)</li> <li>- Rational in thinking (Myer, 1968)</li> <li>- Independent (Marley, 1967)</li> <li>- Exercises judgement (Hill, 1981)</li> <li>- Coordinates (Marley, 1967)</li> <li>- Concentrates (Hill, 1981; Olyanova, 1970)</li> <li>- Attentive to detail (Marley, 1967)</li> <li>- Practical (Marley, 1967)</li> <li>- Dependable (Olyanova, 1970)</li> <li>- Positive in attitude (Marley, 1967)</li> <li>- Reliable (Branston, 1990)</li> <li>- Honest (Hill, 1981)</li> <li>- Frank (Singer, 1969; 1974)</li> <li>- Sincere (Hill, 1981; Singer, 1969)</li> <li>- Impulsive (Olyanova, 1970)</li> </ul>
LITERATURE			<ul style="list-style-type: none"> <li>- Achievement orientated (Costa et al, 1991)</li> <li>- Responsible, dependable (Digman, 1990)</li> <li>- Competent (Costa et al, 1991)</li> <li>- Focuses on a few goals, with purpose (Digman, 1990)</li> <li>- Self disciplined (Costa et al, 1991)</li> <li>- Persistent (Digman, 1990)</li> <li>- Strives for excellence (Costa et al, 1991)</li> </ul>
STEP-WISE	TAT High need for achievement		<ul style="list-style-type: none"> <li>- A desire to accomplish something difficult (Murray, 1938)</li> <li>- A need to master, manipulate or organise physical objects, human beings or ideas, rapidly and independently (Murray, 1938)</li> <li>- A desire to improve and excel (McClelland, 1961; 1975).</li> <li>- A need to overcome obstacles (Murray, 1938)</li> <li>- A need to attain a high standard (McClelland, 1961; 1975; Murray, 1938)</li> <li>- A desire to compete (McClelland, 1961; 1975)</li> <li>- Driven to excel and to achieve standards (McClelland et al, 1961; McClelland &amp; Burnham, 1976)</li> <li>- Derives emotional satisfaction from goal mastery (Maddi, 1976)</li> <li>- Accepts personal responsibility for solving problems (Arnold et al, 1998; Atkinson, 1964; McClelland et al, 1953; McClelland, 1961; McClelland &amp; Burnham, 1976; Sagie et al, 1998; Spangler, 1992; Stahl, 1986)</li> </ul>

FACTOR II TASK ORIENTATION - CONSCIENTIOUS			
SOURCE		SCORER DESCRIPTIONS	
		LOW	HIGH
	TAT High Need for Achieve- ment contd		<ul style="list-style-type: none"> <li>- A fear of failure (Atkinson &amp; Feather, 1966)</li> <li>- Seeks immediate feedback on performance (Arnold et al, 1998; Atkinson, 1964; McClelland et al, 1953; McClelland, 1961; McClelland &amp; Burnham, 1976; Sagie et al, 1998; Spangler, 1992; Stahl, 1986)</li> <li>- Responds to moderate goals (Arnold et al, 1998; Atkinson, 1964; McClelland et al, 1953; McClelland, 1961; McClelland &amp; Burnham, 1976; Sagie et al, 1998; Spangler, 1992; Stahl, 1986)</li> <li>- Succeeds as an entrepreneur, executive (Pervin, 1996) or as a manager of a self-contained unit within a large organisation (McClelland et al, 1974)</li> <li>- Achieves technical, economic (Varga, 1975) or career success (Spangler, 1992)</li> <li>- Contributes to society (Parker &amp; Chusmir, 1991)</li> <li>- Independent (Rokeach, 1973)</li> <li>- Intellectual values (Rokeach, 1973)</li> <li>- Achieves status / wealth (Parker &amp; Chusmir, 1991)</li> </ul>
	16PF		<ul style="list-style-type: none"> <li>- Down to earth (Cattell et al, 1970)</li> </ul>
	16PF More Intelligence	<ul style="list-style-type: none"> <li>- Lower mental capacity (Cattell et al, 1992)</li> <li>- Unable to deal with abstract problems (Cattell et al, 1992)</li> <li>- Disorganised (Cattell et al, 1992)</li> <li>- Poor judgement (Cattell et al, 1992)</li> <li>- Low morale (Cattell et al, 1992)</li> <li>- Gives up easily (Cattell et al, 1992)</li> </ul>	<ul style="list-style-type: none"> <li>- Abstract thinking (Cattell et al, 1970)</li> <li>- Bright (Cattell et al, 1970)</li> <li>- Insight (Cattell et al, 1992)</li> <li>- Intellectually adaptable (Cattell et al, 1992)</li> <li>- Intellectual interests (Cattell et al, 1992)</li> <li>- Judgement (Cattell et al, 1992)</li> <li>- High morale (Cattell et al, 1992)</li> <li>- Persevering (Cattell et al, 1992)</li> <li>- Conscientious (Dunn et al, 1995)</li> </ul>
	TAT Low Need for affiliation	<ul style="list-style-type: none"> <li>- Desire to be liked and accepted (Atkinson, 1964; Boyatzis, 1973; McClelland, 1961; 1985; McClelland &amp; Burnham, 1976; Stahl, 1986)</li> <li>- Suited to group work (Klein &amp; Pridemore, 1992)</li> <li>- Strives for friendship (Atkinson, 1964; Boyatzis, 1973; McClelland, 1961; 1985; McClelland &amp; Burnham, 1976; Stahl, 1986)</li> <li>- Communicative in low stress and limited threat situations (Atkinson, 1964; Boyatzis, 1973; McClelland, 1961; 1985; McClelland &amp; Burnham, 1976; Stahl, 1986)</li> <li>- Service orientated (Smither &amp; Lindgren, 1978)</li> <li>- Seeks cooperative situations where relationships are dependent on mutual understanding (Atkinson, 1964; Boyatzis, 1973; McClelland, 1961; 1985; McClelland &amp; Burnham, 1976; Stahl, 1986)</li> <li>- Helpful (Smither &amp; Lindgren, 1978)</li> </ul>	<ul style="list-style-type: none"> <li>- Results orientated (Carson &amp; Gilliard, 1993)</li> <li>- Self - controlled (McClelland &amp; Boyatzis, 1984)</li> </ul>

FACTOR III - EMOTIONAL STABILITY		
SOURCE	SCORER DESCRIPTIONS	
	LOW	HIGH
WRITING		<ul style="list-style-type: none"> <li>- Emotionally controlled, self assured, self confident (Branston, 1990)</li> <li>- Self-reliant (Myer, 1968), individualistic (Branston, 1990)</li> <li>- Rich in inner values (Myer, 1968)</li> <li>- Empathic (Olyanova, 1970)</li> <li>- Tolerant (Marley, 1967; Myer, 1968)</li> <li>- Self disciplined (Singer, 1974)</li> <li>- Concentrates (Amend &amp; Ruiz, 1980; Hill, 1981; Marley, 1967; Mendel, 1975; Myer, 1968; Nezos, 1989)</li> <li>- Practical (Branston, 1990)</li> <li>- Applies reason (Marley, 1967; Mendel, 1975; Myer, 1968)</li> <li>- Thorough, theoretical, logical (Singer, 1969)</li> <li>- Individualistic (Marley, 1967)</li> <li>- Exercises judgement (Mendel, 1975)</li> <li>- Objective (Hill, 1981; Mendel, 1975)</li> <li>- Conscientious (Marley, 1967)</li> <li>- Accurate ((Branston, 1990; Marley, 1967; Singer, 1974)</li> <li>- Attentive to detail (Marley, 1967)</li> <li>- Adaptable (Marley, 1967).</li> <li>- Ambitious (Branston, 1990)</li> <li>- Sociable (Myer, 1968).</li> <li>- Warm and sensitive (Branston, 1990)</li> </ul>
LITERATURE	<ul style="list-style-type: none"> <li>- Experiences unpleasant emotions easily (Costa et al, 1991)</li> </ul>	<ul style="list-style-type: none"> <li>- Withstands stress, calm, enthusiastic, secure (Digman,1990)</li> </ul>

IV EXTROVERTED INTERPERSONAL ORIENTATION		
SOURCE	SCORER DESCRIPTORS	
	LOW	HIGH
WRITING		<ul style="list-style-type: none"> <li>- Extroverted (Greene &amp; Lewis, 1980; Nezos, 1989; Olyanova, 1970; Singer, 1969)</li> <li>- Communicative (Marley, 1967)</li> <li>- Makes contact with others easily (Nezos, 1989).</li> <li>- Friendly (Hill, 1981)</li> <li>- Agreeable (Mendel, 1975)</li> <li>- Warm (Hill, 1981)</li> <li>- Frank (Branston, 1990)</li> <li>- Receptive (Mendel, 1975; Nezos, 1989)</li> <li>- Mature (Marley, 1967)</li> <li>- Understands others (Marley, 1967)</li> <li>- Observant (Branston, 1990; Hill, 1981; Mendel, 1975; Singer, 1969)</li> <li>- Has self-esteem (Branston, 1990)</li> <li>- Self - assured (Branston, 1990)</li> <li>- Confident (Branston, 1990)</li> <li>- Has a firm, well balanced outlook (Marley, 1967)</li> <li>- Self reliant (Branston, 1990; Marley, 1967; Mendel, 1967; Myer, 1968)</li> <li>- Independent (Mendel, 1975)</li> <li>- Individualistic (Amend &amp; Ruiz, 1980; Branston, 1990; Marley, 1967; Myer, 1968)</li> <li>- Sensitive (Amend &amp; Ruiz, 1980)</li> <li>- Socially orientated (Branston, 1990; Marley, 1967 Myer, 1968; Olyanova, 1970)</li> <li>- Experiences social ease (Marley, 1967)</li> <li>- Sociable (Greene &amp; Lewis, 1980; Hill, 1981)</li> <li>- Spontaneous (Branston, 1990; Marley, 1967; Mendel, 1975)</li> <li>- Empathic (Marley, 1967)</li> <li>- Cooperative (Hill, 1981; Marley, 1967; Myer, 1968)</li> <li>- Attentive (Mendel, 1975)</li> <li>- Compliant (Roman, 1952)</li> <li>- Honest (Hill, 1981)</li> <li>- Action orientated (Mendel, 1975; Nezos, 1989).</li> <li>- Plans (Marley, 1967; Myer, 1968).</li> <li>- Has a sense for calculation and strategy (Marley, 1967)</li> <li>- Concentrates (Singer, 1974)</li> <li>- Thinks consequentially (Myer, 1968) and systematically (Marley, 1967)</li> <li>- Sincere, in females (Mendel, 1975)</li> <li>- Reasons deductively (Marley, 1967; Nezos, 1989)</li> </ul>

IV EXTROVERTED INTERPERSONAL ORIENTATION		
SOURCE	SCORER DESCRIPTORS	
	LOW	HIGH
		<ul style="list-style-type: none"> <li>- Logical in approach (Branston, 1990; Mendel, 1975; Nezos, 1989; Marley, 1967; Myer, 1968; Singer, 1969; 1974)-</li> <li>- Productive in applying intelligence (Myer, 1968; Nezos, 1989)</li> <li>- Shrewd (Marley, 1975)</li> <li>- Has a good memory (Amend &amp; Ruiz, 1980; Nezos, 1989; Singer, 1969; 1974)</li> <li>- Uses concepts in abstract thinking (Marley, 1967; Myer, 1968)</li> <li>- Creative (Amend &amp; Ruiz, 1980)</li> <li>- Imaginative (Branston, 1990; Marley, 1967; Singer, 1974)</li> <li>- Practical (Branston, 1990; Marley, 1967; Myer, 1968)</li> <li>- Concerned with future goals (Amend &amp; Ruiz, 1980; Marley, 1967)</li> <li>- Organises (Marley, 1967)</li> <li>- Active (Branston, 1990; Marley, 1967; Myer, 1968)</li> <li>- Action orientated (Nezos, 1989)</li> <li>- Driven (Branston, 1990)</li> <li>- Ambitious (Mendel, 1975)</li> <li>- Purposeful (Branston, 1990; Marley, 1967)</li> <li>- Energetic females, optimistic males (Mendel, 1975)</li> <li>- Achievement orientated (Singer, 1974)</li> <li>- Industrious (Mendel, 1975)</li> <li>- Purposeful (Branston, 1990; Marley, 1967)</li> <li>- Committed, devoted (Myer, 1968)</li> <li>- Impulsive (Olyanova, 1970)</li> <li>- Adaptable (Branston, 1990; Marley, 1967; Mendel, 1975; Myer, 1968; Nezos, 1989; Roman, 1952; Singer, 1974)</li> <li>- Flexible (Marley, 1967)</li> <li>- Persistent (Marley, 1967)</li> <li>- Persevering (Nezos, 1989)</li> <li>- Determined (Marley, 1967)</li> <li>- Attentive to detail (Mendel, 1975; Singer, 1969; 1974)</li> <li>- Thorough (Olyanova, 1970)</li> <li>- Accurate (Singer, 1969)</li> </ul>
LITERATURE		<ul style="list-style-type: none"> <li>- Extroverted (Costa et al, 1991)</li> <li>- Experiences strong, fast developing and slowly dissipating inhibitions (Melamed &amp; Bozionelis, 1992)</li> <li>- Intolerant of routine work (Melamed &amp; Bozionelis, 1992)</li> <li>- Interpersonally orientated (Goleman, 1995)</li> </ul>



IV EXTROVERTED INTERPERSONAL ORIENTATION			
SOURCE		SCORER DESCRIPTORS	
		LOW	HIGH
STEP WISE	TAT Low Need for Power	<ul style="list-style-type: none"> <li>- Desires control of the environment and influence over others (Steers, 1987)</li> <li>- Superior performance (McClelland, 1975; Steers &amp; Braunstein, 1976)</li> <li>- Leadership (McClelland, 1975; Steers &amp; Braunstein, 1976)</li> <li>- Makes others behave in a way that they would not otherwise have behaved (Atkinson, 1964; McClelland, 1961; 1975; Stahl, 1986)</li> <li>- Enjoys positions of status with authority (Atkinson, 1964; McClelland, 1961; 1975; Stahl, 1986)</li> <li>- Influences others to gain prestige (Atkinson, 1964; McClelland, 1961; 1975; Stahl, 1986)</li> <li>- Given to impulsive actions (Winter, 1988; Winter &amp; Stewart, 1978) like aggression (Winter, 1973) drinking and extreme risk-taking (Winter &amp; Stewart, 1978)</li> <li>- Calls attention to himself (Winter, 1973)</li> <li>- Seeks visibility (Winter, 1973)</li> <li>- Assertive (Meyer &amp; Sutton, 1996)</li> <li>- Establishes himself in an influential position within an organisation (Winter, 1973)</li> <li>- Develops networks of potential allies (Winter, 1973)</li> <li>- Directs people (Winter, 1973)</li> <li>- Sanctions the behaviour of others (Winter, 1973)</li> <li>- Talks a lot in small groups (Winter, 1978)</li> <li>- Influential in eliciting participation and defining participation (Winter, 1973)</li> <li>- Successful as an executive (Cummin, 1967)</li> <li>- Achieves technical and economic success (Varga, 1975)</li> <li>- Maintains visibility (Winter, 1973).</li> <li>- Establishes self in influential positions (Winter, 1973)</li> <li>- Develops networks of potential allies (Winter, 1973)</li> <li>- Assertive (Meyer &amp; Suttan, 1996)</li> <li>- Directs people (Winter, 1973)</li> <li>- Responsibly applied , with ethics, accountability and concern for subordinates (Winter, 1981)</li> <li>- Vulnerability (Fodor &amp; Farrow, 1979)</li> <li>- Ingratiation (Fodor &amp; Farrow, 1979)</li> <li>- Groupthink (Fodor &amp; Farrow, 1979)</li> <li>- Defective decision making (Fodor &amp; Farrow, 1979)</li> <li>- Effectively applied creates a vision and impetus for action (Peters &amp; Austin, 1985)</li> </ul>	<ul style="list-style-type: none"> <li>- Preoccupied with family relationships (Parker &amp; Chusmir, 1991)</li> </ul>

IV EXTROVERTED INTERPERSONAL ORIENTATION			
SOURCE		SCORER DESCRIPTORS	
		LOW	HIGH
	TAT High Dependence		- Relies on others for emotional, economic or other forms of support (Reber, 1986)
	SORT Low Flexibility	<ul style="list-style-type: none"> <li>- Adaptable (Louw, 1975)</li> <li>- Willing to experience new situations (Katzell, 1994)</li> <li>- Accepts situations (Louw, 1975)</li> <li>- Deal with situations maturely (Louw, 1975)</li> <li>- Adjusts to different situations ( Foster, 1989; Louw, 1975)</li> <li>- Successful in jobs (Muchinsky et al, 1998)</li> </ul>	- Consistency in behaviour (Foster, 1989)

FACTOR V - INDEPENDENCE			
SOURCE		SCORER DESCRIPTORS	
		LOW	HIGH
WRITING			<ul style="list-style-type: none"> <li>- Has firmly rooted convictions (Mendel, 1975)</li> <li>- Mature (Marley, 1967; Myer, 1968)</li> <li>- Honest (Hill, 1981)</li> <li>- Objective (Branston, 1990; Marley, 1967; Singer, 1974)</li> <li>- Adaptable (Nezos, 1989)</li> <li>- Practical (Marley, 1967)</li> <li>- Action orientated (Branston, 1990) towards goals (Singer, 1974)</li> <li>- Organised in daily routine (Roman, 1952)</li> <li>- Orderly (Amend &amp; Ruiz, 1980; Branston, 1990; Marley, 1967; Mendel, 1975; Roman, 1952)</li> <li>- Thinks consequentially (Meyer, 1968)</li> <li>- Coordinates (Singer, 1969)</li> <li>- Has perceptive intelligence (Roman, 1952)</li> <li>- Intelligence (Branston, 1990; Green &amp; Lewis, 1989; Hill, 1981; Singer, 1969; 1974)</li> <li>- Mentally agile (Branston, 1990)</li> <li>- Creative (Marley, 1967)</li> <li>- Concentrates (Hill, 1981; Marley, 1967; Singer, 1969; 1974)</li> <li>- Applies judgement ((Marley, 1967; Myer, 1968; Olyanova, 1970)</li> <li>- Logical (Branston, 1990)</li> <li>- Communicative (Branston, 1990)</li> <li>- Spontaneous (Hill, 1981; Mendel, 1975)</li> <li>- Reliable (Branston, 1990)</li> <li>- Purposeful (Singer, 1974)</li> <li>- Adaptable (Nezos, 1989)</li> </ul>
LITERATURE		<ul style="list-style-type: none"> <li>- Values harmony (Digman, 1990)</li> <li>- Considers the needs of others (Digman, 1990)</li> <li>- Compassionate (Costa et al, 1991)</li> </ul>	<ul style="list-style-type: none"> <li>- Wants own way and say (Digman, 1990)</li> <li>- Focuses on own needs (Digman, 1990)</li> <li>- Changes or circumvents rules to suit the situation (Digman, 1990)</li> </ul>
STEP-WISE	SORT Internal Locus of control	<ul style="list-style-type: none"> <li>- Rigid (Cilliers &amp; Wissing, 1993)</li> <li>- Dogmatic (Cilliers &amp; Wissing, 1993)</li> <li>- Compulsive (Cilliers &amp; Wissing, 1993)</li> <li>- Anxious (Blau, 1993)</li> <li>- Gives up in the face of competition (Davis &amp; Phares, 1969; Spector, 1982)</li> <li>- Conforming (Crowne &amp; Liverant, 1963)</li> <li>- Compliant (Hawk, 1989)</li> <li>- Likely to be absent (Blau, 1993; Spector, 1982)</li> <li>- Suited to structured jobs (Hawk, 1989)</li> <li>- Alienated (Blau, 1993; Spector, 1982)</li> <li>- Believes that he has little control over organisational outcomes (Digman, 1990)</li> <li>- Uninvolved in work (Blau, 1993; Spector, 1982)</li> </ul>	<ul style="list-style-type: none"> <li>- Believes that hard work, skill, acceptance of responsibility and foresight lead to positive outcomes (Chance, 1965)</li> <li>- Believes that there is control over the work environment, that work procedures, working conditions, task assignments and relationships can be influenced and resists close supervision (Hawk, 1994)</li> <li>- Effective in interpersonal relationships (Meyer &amp; Suttan, 1996)</li> <li>- Awareness that hard work, skill, acceptance of responsibility and foresight lead to positive outcomes (Chance, 1965)</li> <li>- Flexible in responding to situational demands (Cilliers &amp; Wissing, 1993)</li> <li>- Motivated (Spector, 1982)</li> <li>- Successful (Bar-Tal &amp; Bar-Zohar, 1977)</li> <li>- Convinced that effort leads to performance (Spector, 1982)</li> <li>- Quits dissatisfying jobs (Digman, 1990)</li> </ul>

FACTOR V - INDEPENDENCE			
SOURCE		SCORER DESCRIPTORS	
		LOW	HIGH
	SORT High Flexibility	<ul style="list-style-type: none"> <li>- Consistency in behaviour (Foster, 1989)</li> </ul>	<ul style="list-style-type: none"> <li>- Adaptable (Louw, 1975)</li> <li>- Willing to experience new situations (Katzell, 1994)</li> <li>- Accepts situations (Louw, 1975)</li> <li>- Deal with situations maturely (Louw, 1975)</li> <li>- Adjusts to different situations ( Foster, 1989; Louw, 1975)</li> <li>- Successful in jobs (Muchinsky et al, 1998)</li> </ul>
	16PF Shrewd		<ul style="list-style-type: none"> <li>- Astute (Cattell et al, 1970)</li> <li>- Wordly (Cattell et al, 1970)</li> <li>- Calculating (Cattell et al, 1992)</li> <li>- Socially aware (Cattell et al, 1992)</li> <li>- Insightful (Cattell et al, 1992)</li> <li>- Emotionally detached (Cattell et al, 1992)</li> <li>- Disciplined (Cattell et al, 1992)</li> <li>- Artful (Cattell et al, 1992)</li> <li>- Aesthetically fastidious (Cattell et al, 1992)</li> <li>- Ambitious (Cattell et al, 1992)</li> <li>- Insecure (Cattell et al, 1992)</li> <li>- Smart in cutting corners (Cattell et al, 1992)</li> </ul>
	16PF Expedient		<ul style="list-style-type: none"> <li>- Disregards rules (Cattell et al, 1970)</li> </ul>

FACTOR VI CONCEPTUALISATION			
SOURCE		SCORER DESCRIPTORS	
		LOW	HIGH
WRITING			<ul style="list-style-type: none"> <li>- Practical (Branston, 1990; Marley, 1967)</li> <li>- Action orientated (Marley, 1967)</li> <li>- Independent (Amend &amp; Ruiz, 1980)</li> <li>- Concentrates (Hill, 1981; Singer, 1969)</li> <li>- Exercises judgment (Olyanova, 1970)</li> <li>- Applies reason (Marley, 1967; Mendel, 1975; Myer, 1968)</li> <li>- Has a factual memory (Olyanova, 1970)</li> <li>- Dependable (Branston, 1990)</li> <li>- Efficient (Amend &amp; Ruiz, 1980)</li> <li>- Self-controlled (Singer, 1974)</li> <li>- Self-disciplined (Singer, 1974)</li> <li>- Tactful (Branston, 1990; Marley, 1967; Myer, 1968)</li> <li>- Extroverted (Hartford, 1986)</li> <li>- Impulsive (Amend &amp; Ruiz, 1980)</li> <li>- Action orientated (Marley, 1967)</li> <li>- Independent (Amend &amp; Ruiz, 1980)</li> <li>- Concentrates (Hill, 1981; Singer, 1969)</li> <li>- Exercises judgment (Olyanova, 1970)</li> <li>- Applies reason (Marley, 1967; Mendel, 1975; Myer, 1968)</li> <li>- Has a factual memory (Olyanova, 1970)</li> <li>- Practical and dependable (Branston, 1990)</li> <li>- Efficient (Amend &amp; Ruiz, 1980)</li> <li>- Self controlled and self-disciplined (Singer, 1974)</li> <li>- Tactful (Branston, 1990; Marley, 1967; Myer, 1968)</li> <li>- Extroverted (Hartford, 1986)</li> <li>- Impulsive (Amend &amp; Ruiz, 1980)</li> </ul>
LITERATURE		<ul style="list-style-type: none"> <li>- Does not think strategically (Hogan, 1989)</li> <li>- Does not learn from experience (Hogan, 1989)</li> </ul>	<ul style="list-style-type: none"> <li>- Intelligent (Lord, de Vader &amp; Alliger, 1986; Melamed &amp; Bozionelis, 1992)</li> <li>- Curious (Digman, 1990)</li> <li>- Open to experience (Digman, 1990)</li> <li>- Acquires and applies knowledge (Howard &amp; Howard, 1995; Stodgill, 1984)</li> <li>- Has common sense (Sternberg et al, 1995)</li> <li>- Exercises judgement (Stodgill, 1984)</li> <li>- Decisive (Stodgill, 1984)</li> <li>- Fluent in speech (Stodgill, 1984)</li> <li>- Creates, processes and disperses information (Jencks, 1989)</li> </ul>
STEP WISE	16PF Com-placent	<ul style="list-style-type: none"> <li>- Self reproaching (Cattell et al, 1970)</li> <li>- Worrying (Cattell et al, 1970)</li> <li>- Troubled (Cattell et al, 1970)</li> <li>- Insecure (Cattell et al, 1970)</li> </ul>	<ul style="list-style-type: none"> <li>- Self-assured (Cattell et al, 1970)</li> <li>- Placid (Cattell et al, 1970)</li> <li>- Secure (Cattell et al, 1970)</li> <li>- Resilient, cheerful, placid, expedient (Cattell et al, 1992)</li> </ul>
	16PF Expedient		<ul style="list-style-type: none"> <li>- Disregards rules (Cattell et al, 1970)</li> <li>- Feels few obligations (Cattell et al, 1970)</li> </ul>

FACTOR VI CONCEPTUALISATION			
SOURCE		SCORER DESCRIPTORS	
		LOW	HIGH
	SORT High Social Respon- sibility		<ul style="list-style-type: none"> <li>- Willing to be subservient, even if this is not for personal gain (Louw, 1975)</li> <li>- Accepts obligations (Louw, 1975)</li> </ul>
	SORT High Deduction		<ul style="list-style-type: none"> <li>- Logical application of existing theories, principles (Louw, 1975)</li> <li>- Generalisation (Louw, 1975)</li> <li>- Analysis of relationships (Louw, 1975)</li> </ul>

FACTOR VII OPENNESS TO EXPERIENCE			
SOURCE		SCORER DESCRIPTORS	
		LOW	HIGH
WRITING			<ul style="list-style-type: none"> <li>- Receptive , tolerant, flexible, expedient (Marley, 1967)</li> <li>- Optimistic (Mendel, 1975)</li> <li>- Resourceful and adaptable (Branston, 1990)</li> <li>- Expedient, with strong convictions (Mendel, 1975)</li> <li>- Sensitive (Branston, 1990; Hill, 1981; Marley, 1967; Myer, 1968)</li> <li>- Mature (Mendel, 1975)</li> <li>- Attentive to detail (Branston, 1990)</li> <li>- Creative (Mendel, 1975)</li> <li>- Confident (Nezos, 1989)</li> <li>- Dependable (Olyanova, 1970)</li> <li>- Consistent (Mendel, 1975)</li> <li>- Sincere (Hill, 1981)</li> <li>- Honest (Amend &amp; Ruiz, 1980; Hill, 1981)</li> <li>- Truthful (Hill, 1981)</li> <li>- Ethical and thinks rationally (Myer, 1968)</li> <li>- Determined (Amend &amp; Ruiz, 1980)</li> </ul>
LITERATURE			<ul style="list-style-type: none"> <li>- Enjoys new experiences (Costa et al, 1991)</li> <li>- Innovative, imaginative, intrigued by novelty (Digman, 1990)</li> <li>- Creative (Digman, 1990)</li> <li>- Intellectual (Digman, 1990)</li> </ul>
STEP-WISE	16PF Experimenting		<ul style="list-style-type: none"> <li>- Liberal (Cattell et al, 1970)</li> <li>- Analytical (Cattell et al, 1970)</li> <li>- Free thinking (Cattell et al, 1970)</li> <li>- Well informed (Cattell et al, 1992)</li> <li>- Keen to experiment with new ideas (Cattell et al, 1992)</li> <li>- Avoids moralistic judgements (Cattell et al, 1992)</li> <li>- Aggressive (Karson &amp; O'Dell, 1974)</li> <li>- Radical (Karson &amp; O'Dell, 1974)</li> <li>- Tramples on others (Karson &amp; O'Dell, 1974)</li> </ul>
	16PF Apprehensive		<ul style="list-style-type: none"> <li>- Self reproaching (Cattell et al, 1970)</li> <li>- Worrying (Cattell et al, 1970)</li> <li>- Troubled (Cattell et al, 1970)</li> <li>- Insecure (Cattell et al, 1970)</li> </ul>
		<p>Desires control of the environment and influence over others (Steers, 1987)</p> <ul style="list-style-type: none"> <li>- Superior performance (McClelland, 1975; Steers &amp; Braunstein, 1976).</li> <li>- Leadership (McClelland, 1975; Steers &amp; Braunstein, 1976)</li> <li>- Makes others behave in a way that they would not otherwise have behaved (Atkinson, 1964; McClelland, 1961; 1975; Stahl, 1986)</li> <li>- Enjoys positions of status with authority (Atkinson, 1964; McClelland, 1961; 1975; Stahl, 1986)</li> </ul>	<ul style="list-style-type: none"> <li>- Preoccupied with family relationships (Parker &amp; Chusmir, 1991)</li> </ul>

FACTOR VII OPENNESS TO EXPERIENCE			
SOURCE		SCORER DESCRIPTORS	
		LOW	HIGH
	TAT Low Need for Power	<ul style="list-style-type: none"> <li>- Influences others to gain prestige (Atkinson, 1964; McClelland, 1961; 1975; Stahl, 1986)</li> <li>- Given to impulsive actions (Winter, 1988; Winter &amp; Stewart, 1978) like aggression (Winter, 1973) drinking and extreme risk-taking (Winter &amp; Stewart, 1978)</li> <li>- Calls attention to himself (Winter, 1973)</li> <li>- Seeks visibility (Winter, 1973)</li> <li>- Assertive (Meyer &amp; Sutton, 1996)</li> <li>- Establishes himself in an influential position within an organisation (Winter, 1973)</li> <li>- Develops networks of potential allies (Winter, 1973)</li> <li>- Directs people (Winter, 1973)</li> <li>- Sanctions the behaviour of others (Winter, 1973)</li> <li>- Talks a lot in small groups (Winter, 1978)</li> <li>- Influential in eliciting participation and defining participation (Winter, 1973)</li> <li>- Successful as an executive (Cummin, 1967)</li> <li>- Achieves technical and economic success (Varga, 1975)</li> <li>- Maintains visibility (Winter, 1973)</li> <li>- Establishes himself in influential positions (Winter, 1973)</li> <li>- Develops networks of potential allies (Winter, 1973)</li> <li>- Assertive (Meyer &amp; Suttan, 1996)</li> <li>- Directs people (Winter, 1973)</li> <li>- Responsibly applied, with ethics, accountability and concern for subordinates (Winter, 1981)</li> <li>- Vulnerability (Fodor &amp; Farrow, 1979)</li> <li>- Ingratiation (Fodor &amp; Farrow, 1979)</li> <li>- Groupthink (Fodor &amp; Farrow, 1979)</li> <li>- Defective decision making (Fodor &amp; Farrow, 1979).</li> <li>- Creates a vision and impetus for action (Peters &amp; Austin, 1985).</li> </ul>	



FACTOR VIII NEED FOR POWER			
SOURCE		SCORER DESCRIPTORS	
		LOW	HIGH
WRITING			<ul style="list-style-type: none"> <li>- Ethical, based on rational thinking (Myer, 1968)</li> <li>- Intelligent (Hill, 1981; Singer, 1969)</li> <li>- Mentally agile (Branston, 1990)</li> <li>- Exercise judgement (Hill, 1981)</li> <li>- Creative, resourceful, adaptable (Branston, 1990)</li> <li>- Fluent (Hill, 1981)</li> </ul>
LITERATURE			<ul style="list-style-type: none"> <li>- Concerned with results above popularity (Conger, 1990)</li> <li>- Makes tough decisions (Conger, 1990)</li> </ul>
STEP-WISE	TAT Need for power	<ul style="list-style-type: none"> <li>- Concerned with family relationships (Parker &amp; Chusmir, 1991)</li> </ul>	<ul style="list-style-type: none"> <li>- Desires control of the environment and influence over others (Steers, 1987)</li> <li>- Superior performance (McClelland, 1975; Steers &amp; Braunstein, 1976)</li> <li>- Leadership (McClelland, 1975; Steers &amp; Braunstein, 1976)</li> <li>- Makes others behave in a way that they would not otherwise have behaved (Atkinson, 1964; McClelland, 1961; 1975; Stahl, 1986)</li> <li>- Enjoys positions of status with authority (Atkinson, 1964; McClelland, 1961; 1975; Stahl, 1986)</li> <li>- Influences others to gain prestige (Atkinson, 1964; McClelland, 1961; 1975; Stahl, 1986)</li> <li>- Given to impulsive actions (Winter, 1988; Winter &amp; Stewart, 1978) like aggression (Winter, 1973) drinking and extreme risk-taking (Winter &amp; Stewart, 1978)</li> <li>- Calls attention to himself (Winter, 1973)</li> <li>- Seeks visibility (Winter, 1973)</li> <li>- Assertive (Meyer &amp; Sutton, 1996)</li> <li>- Establishes himself in an influential position within an organisation (Winter, 1973)</li> <li>- Develops networks of potential allies (Winter, 1973)</li> <li>- Directs people (Winter, 1973)</li> <li>- Sanctions the behaviour of others (Winter, 1973)</li> <li>- Talks a lot in small groups (Winter, 1978)</li> <li>- Influential in eliciting participation and defining participation (Winter, 1973)</li> <li>- Successful as an executive (Cummin, 1967)</li> <li>- Achieves technical and economic success (Varga, 1975)</li> <li>- Maintains visibility; establishes self in influential positions and develops networks of potential allies (Winter, 1973)</li> <li>- Assertive (Meyer &amp; Suttan, 1996)</li> <li>- Directs people (Winter, 1973)</li> <li>- Responsibly applied, with ethics, accountability and concern for subordinates (Winter, 1981)</li> <li>- Vulnerability (Fodor &amp; Farrow, 1979)</li> <li>- Ingratiation (Fodor &amp; Farrow, 1979)</li> <li>- Groupthink (Fodor &amp; Farrow, 1979)</li> <li>- Defective decision making (Fodor &amp; Farrow, 1979)</li> <li>- Effectively applied creates a vision and impetus for action (Peters &amp; Austin, 1985)</li> </ul>
	16PF More Intelligence		<ul style="list-style-type: none"> <li>- Abstract thinking (Cattell et al, 1970)</li> <li>- Bright (Cattell et al, 1970)</li> </ul>

FACTOR VIII NEED FOR POWER			
SOURCE		SCORER DESCRIPTORS	
		LOW	HIGH
	16PF Tough-mindedness		<ul style="list-style-type: none"> <li>- Rejects illusions (Cattell et al, 1970)</li> <li>- Expects little (Cattell et al, 1992)</li> <li>- Unsentimental (Cattell et al, 1992)</li> <li>- Accepts responsibility (Cattell et al, 1992)</li> <li>- Hard to the point of cynicism (Cattell et al, 1992)</li> <li>- Limited in artistic fantasies, whilst not lacking taste (Cattell et al, 1992)</li> <li>- Unaffected by fancies (Cattell et al, 1992)</li> <li>- Acts on practical, logical evidence (Cattell et al, 1992)</li> <li>- Sticks to the point (Cattell et al, 1992)</li> <li>- Does not dwell on physical disabilities (Cattell et al, 1992)</li> <li>- Tough (Cattell et al, 1992)</li> <li>- Masculine (Cattell et al, 1992)</li> <li>- Mature (Cattell et al, 1992)</li> <li>- Realistic (Cattell et al, 1992)</li> </ul>
	SORT Low Impulsiveness	<ul style="list-style-type: none"> <li>- Makes decisions on the spur of the moment (Louw, 1975)</li> <li>- Reacts to stimuli without forethought (Louw, 1975)</li> <li>- Brisk in reacting quickly in response to changes (Strelau &amp; Zawadzki (1995)</li> </ul>	<ul style="list-style-type: none"> <li>- Plans deliberately to secure power (Winter &amp; Stewart, 1978)</li> </ul>



**MANUAL FOR THE 7 GRAPHOLOGY FACTORS SCALE [7GFS]**

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# **1 BACKGROUND**

## **1.1 Introduction**

Personality is a key determinant of behaviour at work (Adler & Weiss, 1988), and the need to achieve a fit between the personality (amongst other factors) and the needs of the job is a fundamental requirement for effective performance (Muchinsky et al, 1998). The job of the manager is especially critical to economic development (Mintzberg, 1998). Imported personality tests have been adjudged to be unsuitable for use in South Africa (Abrahams, 1996; England, 1991), and legislation like the Employment Equity Act (Act 60 of 1998) intensifies the need to tap the potential of those that have been historically disadvantaged (Albertyn & White, 1994), whilst assessing personality in ways that do not attract charges of adverse impact (Cronshaw, 1986), as experienced in the United States of America in the 1960s and 1970s (Aamodt, 1996).

Graphology, the science of writing analysis, is one of the oldest psychological approaches to assess personality (Roman, 1952). A written protocol serves as projected material, comprising both unconscious and conscious personality indicators. There is no intervening culturally biased or language-based test form that can be charged with disadvantaging the historically disadvantaged. Language and content are irrelevant as it is the configuration of the writing that is the basis of the analysis. Graphology is widely applied in organisations in France (Bruchon-Schweitzer & Ferrieu, 1991) and Israel (Edwards & Armitage, 1991), and is a technique that can be added to the repertoire of tools available for personality assessment in South Africa. The 7GFS provides a structured and standardised approach to the assessment of managerial personality attributes.

## **1.2 Aim**

The aim of the 7GFS is through handwriting analysis to measure personality characteristics which contribute to effective functioning at a managerial level. The 7GFS provides supplementary information and does not purport to measure the universe of the job of the manager. It should not, therefore, be used as the sole

determinant for making selection decisions.

### **1.3 Description**

The 7GFS requires a page of original handwriting on unlined paper for analysis (Graumann, 1983) from the respondent. A scoring key, raw score conversion table and norm tables, converted to bands, is available for interpretation of the results. The factors measured by the 7GFS are described.

#### **1.3.1 Advantages**

- a) The 7GFS can be administered to an individual or as a group test.
- b) It has been developed from analysing the job of a manager in a financial institution in South Africa.
- c) Objective scores are obtained and interpretation is simplified through the statistical procedures which have been applied in standardising the scale.
- d) The 7GFS can be administered to anyone who can write and who is being considered for a supervisory or middle management position.
- e) The language and content of the writing are irrelevant to the result.

#### **1.3.2 Construction of the 7GFS**

The 7GFS is founded on the principles of depth psychology (Freud, 1973; Jung, 1991). The dimensional approach (Cattell, 1978) adds statistical elements which accord with scientific endeavour. The 7GFS is predicated on job analysis which established adjectives—grouped under the categories mental functioning, personal qualities, motivation, interpersonal orientation, management attributes and work orientation—describing positive management behaviour (Elliott, 1994). This is line with the principle that job analysis determines the basic criteria for assessment (Baxter et al, 1969; Muchinsky et al, 1998). Handwriting attributes to measure the relevant personality characteristics stemmed from a literature study (Elliott, 1994). The original scale, comprising 229 handwriting characteristics, applied to 125 subjects employed in a financial institution. Factor analysis resulted in seven factors, based on 60 handwriting

attributes and complying with the quantitative requirements highlighted by Cattell (1978). In a second research phase, the 7GFS is standardised for application in industry. Subjects drawn from a financial institution and stratified according to gender, position, and language complete the Thematic Apperception Test [TAT] Card 1, which is used for the TAT and the handwriting analysis, the Structured Objective Rorschach Test [SORT], and the 16 Personality Factors Test [16PF]. The handwritten protocols are scored in accordance with the instructions for the 7GFS, and the accepted cases subjected to statistical procedures (refer Appendix A). Descriptive statistics provide means and standard deviations for language, language and gender, and language, gender and position, and an age analysis for managers and supervisors and marketers and administrators (refer Appendix B). The results are subjected to factor analysis (refer Appendix D), stepwise regression analysis (refer Appendix E), three-way analysis of variance (refer Appendix H), t-tests (refer Appendix I), and the Mantel-Haenszel test (refer Appendix J).

The 7GFS provides a raw score for the respondent, which when converted to bands results in a sten indicating a tendency towards one or the other side of a bipolar continuum. The eight Factors measured by the 7GFS are indicated in Table 1:

**Table 1 The Factors measured by the 7GFS**

I	Task orientation - considerate (democratic)	↔	Task orientation - directive (authoritarian)
II	Task orientation - less conscientious	↔	Task orientation - more conscientious
III	Emotional	↔	Emotionally stable
IV	Introverted interpersonal orientation	↔	Extroverted interpersonal orientation
V	Dependent	↔	Independent
VI	Conceptualisation - concrete	↔	Conceptualisation - abstract
VII	Conventional	↔	Open to Experience
VIII	Low Need for Power	↔	High Need for Power



Descriptions of these factors are based first on the adjectives derived from the analysis of the job of a manager and clustered through the process of factor analysis; secondly, on a literature study; and thirdly, supplemented by the descriptors from the TAT, SORT and 16PF, where significant relationships emerge through stepwise regression analysis (refer Appendix N).

## **2 INSTRUCTIONS FOR THE APPLICATION OF THE TEST**

### **2.1 General instructions**

#### **2.1.1 Tester**

The qualifications of the tester are determined by the choice of written protocol for analysis:

- a) The preferred alternative is that the protocol for analysis is a written response to the TAT (Singer, 1969), dictating that the tester must be a psychotechnician, supervised by a Psychologist in terms of Act 56 of 1974.
- b) The second alternative is that a page of writing on any topic is acquired from the subject, ensuring that it is an original, spontaneous composition written on unlined paper. The tester needs to be instructed in the administration requirements for the test.

#### **2.1.2 Test room**

In the event of the written protocol being a TAT response, the testing conditions should conform to those typically required for that procedure. If the alternative is chosen, the respondent should be seated at an uncluttered desk in a quiet environment.

#### **2.1.3 Test material**

- a) The respondent requires a blank page of unlined A4 paper (Graumann, 1983),

with an unlined backing board on which to rest the paper. A choice of writing implements, preferably excluding pencils, should be made available (Singer, 1969).

- b) The tester requires the instructions and Card for the TAT, if this is the chosen method of administration. In the alternative, the tester should be prepared to give instructions as indicated in 2.2.

#### **2.1.4 Subjects**

The 7GFS can be administered to any persons who are being considered for selection or development into a managerial position.

#### **2.1.5 Testing time**

There is no time limit for the completion of the page of writing. However, subjects should be discouraged from labouring to practice or perfect their writing or grammar.

#### **2.1.6 General**

It may be necessary to encourage the subject to complete the task quickly or to provide a further paragraph. Therefore, the tester should check what is being written, without obviously reading the content or distracting the subject from the writing task. The page should be collected on completion and checked to ensure that it is signed and that the necessary biographical details are supplied.

### **2.2 Instructions to subjects**

Unless the instructions are typical for the TAT, verbal instructions to the subjects, in their language of choice, should be along the following lines:

“You are required to provide a page of writing for analysis. You should note your name at the top of the page and the country where you learnt to write. Write approximately

sixteen lines and sign the end as you would a cheque. Please write about how you would approach the job of a manager / what you would enjoy about managing people. There is no time limit and should you require additional paper this can be supplied. There is no wrong or right writing and you should write as quickly as you normally do. Cursive is better than printscript for the analysis. Do not be concerned about spelling and grammar as the content is not important to the analysis. You should write in your first language.”

The instructions may be repeated, questions answered and, if considered necessary, key points and requirements can be noted on a flipchart.

### **3 SCORING THE 7GFS**

The scoring of the 7GFS is dependent on the competence of the tester to recognise the presence or absence of the written attributes from the 7GFS scoring key. This procedure requires training and practice, and an unqualified individual should not attempt to score a written protocol (refer Appendix E).

### **4 INTERPRETATION**

The 7GFS scoring key (refer Appendix E) makes provision for adding the weighted raw scores applicable to the attributes that have been identified in the writing. This will result in a positive or negative score for each of the factors. The final negative score for the factors other than III and VIII, where there are no negative scores possible, should be deducted from the positive scores. The constant score indicated for all but Factors III and VIII should be added to the total score. The conversion to norms and comparison of respondent scores to profiles is detailed in Section 5.

In order to enrich the interpretation, it is necessary for a psychologist trained in graphology to apply judgement in a written report which indicates which of the personality characteristics clustered in each Factor can be expected to be evidenced most strongly in the role of a manager. Reasons for the expected personality characteristics can be advanced, and a development plan suggested by an individual

appropriately trained in graphology.

## **5 NORMS**

Norms, in stens, are provided for each Factor, for English, Afrikaans and Indigenous first-language speakers. These have been transformed into five bands to compensate for differences between the different groups. These should be utilised to achieve the converted score (refer Appendix K).

The results can be plotted onto the profile in Figure 1. Comparative scores are indicated for the managers / supervisors and administrators / marketers, comprising the sample in the standardisation of the 7GFS.

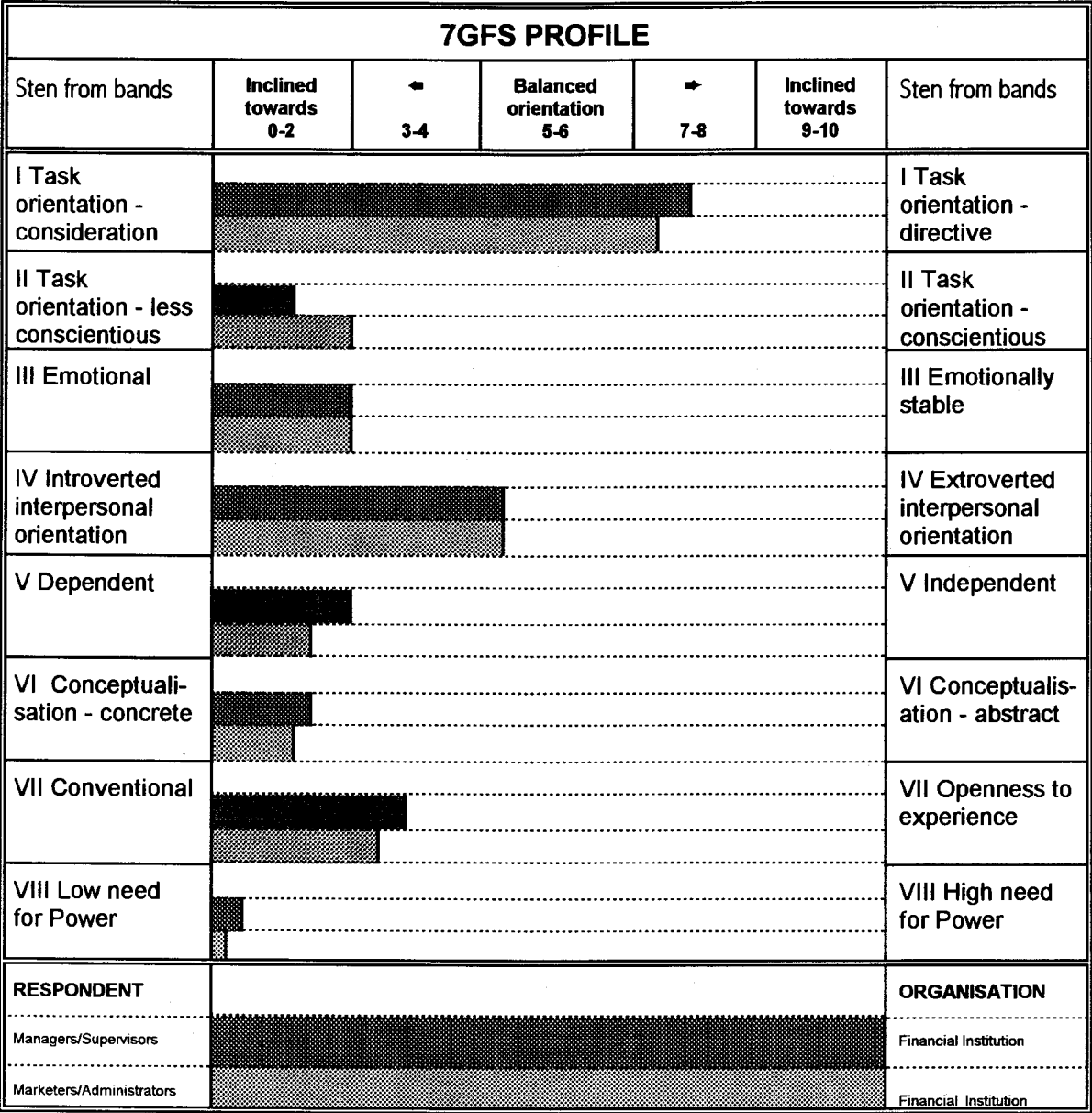


Figure 1 7GFS Profile

6 RELIABILITY

Reliability coefficients are provided below, as calculated by Cronbach's alpha:

I = 0,611; II 0, 308; III 0, 149; IV 0,054; V 0,141; VI 0,186, VII 0,0111; VIII 0, 302

## **7 VALIDITY**

Content validity is demonstrated from Cronbach's Alpha coefficient (refer 6 above) and the prediction of the combined variables of the stepwise regression analysis (Multiple R) on the stepwise regression analysis (refer Appendix G).

Construct validity is evident from the relationships between the factors of the 7GFS and those of the TAT, SORT and 16PF, for all but Factor III (refer Appendix G). Factor III is hypothesised to be a new construct.

Differential validity applies to gender with reference to Factors II, III VII and VIII (refer Appendix I).

Job specific validity applies to Factors V and VII (refer Appendix H).

Language bias applies to Factors V and VI (refer Appendix J). The provision of bands (refer Appendix K) compensates for bias in the 7GFS.

The 7GFS does not measure the universe of the job of the manager. Therefore predictive validity is not appropriate for the 7GFS.